RHEWA
Waagen

Indicator 82comfort
Service Guide

RHEWA–WAAGENFABRIK
August Freudewald GmbH & Co. KG

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Technical modifications

Rapidly advancing technological developments and shorter product cycles prevent us from bringing this documentation exactly into line with the device functions and properties. Should any deviations exist, the device is to be used in the appropriate way.

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2.1 Overview

The documentation for this indicator has been compiled with the target audience in mind. Essentially, we have distinguished between two user groups:

- **Operatives**, users, weighing instrument operators
- **Service technicians**, customer service, weighing instrument dealers

The various needs of these users have been taken into account.

Example:

This SERVICE GUIDE contains information on the connection and configuration of weighing instruments, peripherals and optional add-ons and is aimed at service technicians. Described here are the various setting, connection and device options and related technical details.

This information is too extensive for the device operative, as the content goes far beyond the knowledge required to operate the device. An OPERATING MANUAL that concentrates solely on how to use the available functions has therefore been compiled for device operatives.

- The process of setting up the alibi memory is described in this SERVICE GUIDE, while the steps for displaying or outputting the stored values are documented in the OPERATING MANUAL.
- The time and date can be set by the operative. Key features such as automatic summer-winter changeover and the calculation or setting of the calibration factor should be left to the service technician and are therefore included in the SERVICE GUIDE.

2.2 Basic concept

- Each device function has its own chapter in the documentation.
- Using the device functions is described in the OPERATING MANUAL.
- Adapting functions to suit personal requirements or installing add-ons is included in the SERVICE GUIDE. How to use the functions is not described a second time in the SERVICE GUIDE.

2.3 Documents by target audience

The available documents were written for the following target audiences.

Audience	Operatives	Service technicians
Documents	Operating manual	Service guide
		Adjustment guide
		Instructions guide
		Optional plug-in cards

3.1 Safety information

Personnel working on the electronics must discharge themselves beforehand and ensure they do not become charged again while working.

An anti-static wristband must be used.

➔ Shut down the device.

➔ Remove the mains plug or cut off the power (switch, fuse) and safeguard against inadvertent reconnection.

➔ Put on anti-static wristband.

➔ Connect anti-static wristband (e.g. to earthing contact of a socket outlet).

➔ Touch the indicator enclosure to place yourself at the same potential.

➔ Remove components to be retrofitted from the anti-static packaging.

➔ Perform the work on the electronics.

Make sure you comply with the safety information. Improper handling of electronic assemblies can result in their being destroyed. No guarantee can be assumed for any defects that occur in this case.

- When working on the enclosure, the electronics or the wiring, always ensure that no metal residues whatsoever are left inside the enclosure.
- Soldered or clamped wires must not protrude or be in contact with any components or the board.
- Ensure that the strands of the braided shield have no frayed ends and cannot come into contact with terminals or components. Enclose the braided shield in a protective jacket, if necessary.

All cables run into the enclosure must be round shielded cables. Please follow the instructions in Chapter 8 “Cable gland assembly“ on page 37 when installing the cables.

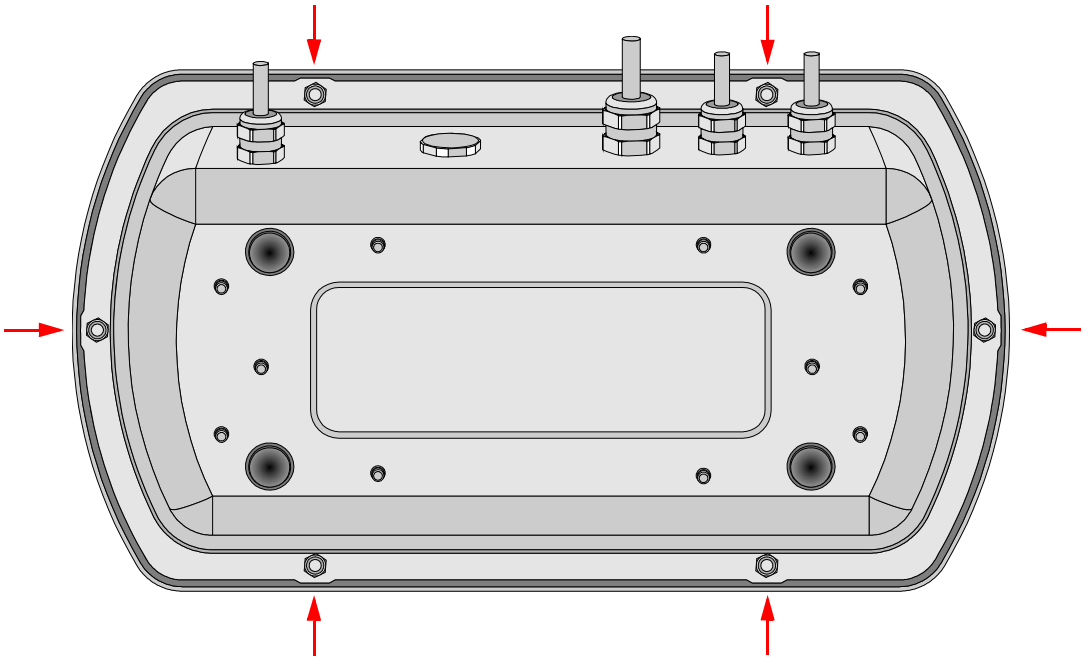
The quoted EMC and noise immunity categories and IP65 protection apply only on correct installation in accordance with these instructions.

3.2 Opening the enclosure

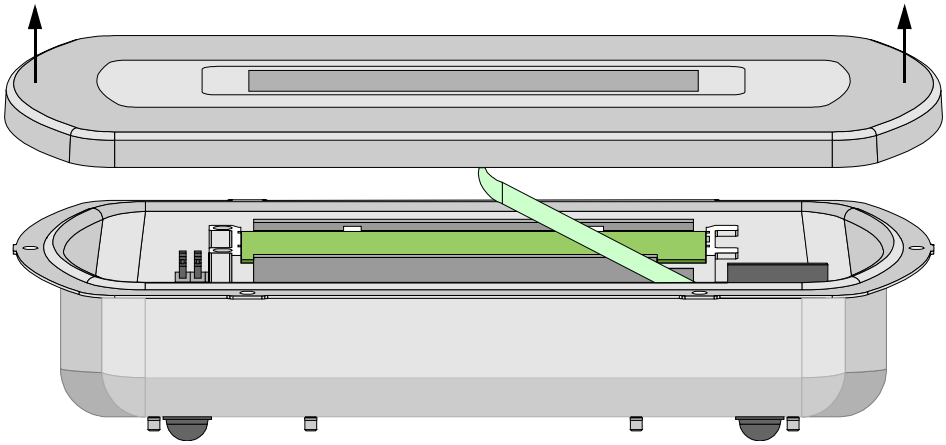
Shut down the device.

Cut off the power supply, remove the mains plug.
Do not restore the power supply until the device has been closed again.

Loosen the 6 M4 nuts on the device rear using a 7 mm socket wrench.

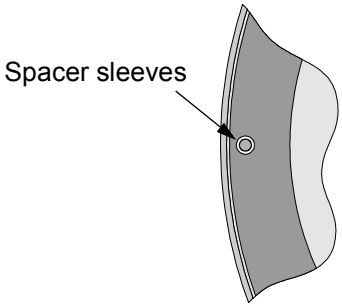


Lift off the enclosure cover perpendicular to the device.



Caution!
The keypad ribbon cable is plugged into the main board. Do not tear off the ribbon cable or remove forcibly from the connector. Do not bend or kink the cable.

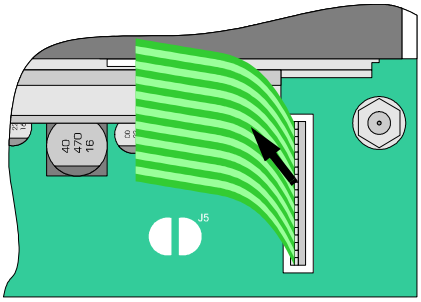
The glued-in enclosure gasket is located on the inside of the cover. To ensure the correct distance between the gasket flange and the cover when closing the enclosure, spacer sleeves are inserted on the threaded pins. The spacer sleeves must not be mislaid.



3.2.1 Disconnecting the keypad

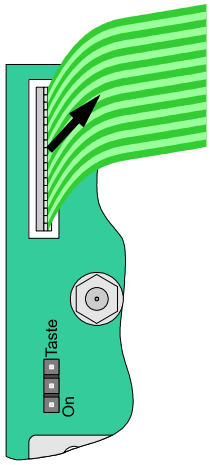
Desktop setup

The plug-and-socket connection is situated to the bottom right on the main board.
The ribbon cable is not clamped in the connector.
Lift the ribbon cable vertically out of the connector.



Wall setup

The plug-and-socket connection is situated to the top left on the main board.
The ribbon cable is not clamped in the connector.
Lift the ribbon cable vertically out of the connector.



3.3 Closing the enclosure

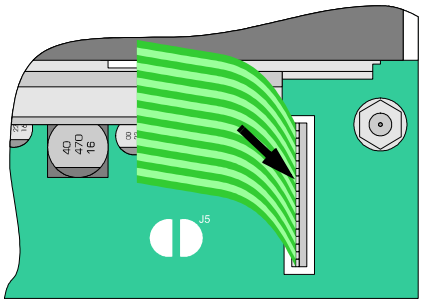
On completion of the work carefully close the device.
Make sure no metal residues (i.e. swarf, cable residues or strands of the braided shield) are left inside the indicator.

3.3.1 Connecting the keypad

Desktop setup

The plug-and-socket connection is situated at the bottom right on the main board.

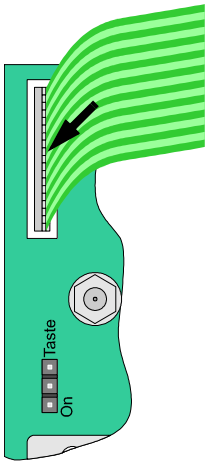
Insert the ribbon cable.



Wall setup

The plug-and-socket connection is situated at the top left on the main board.

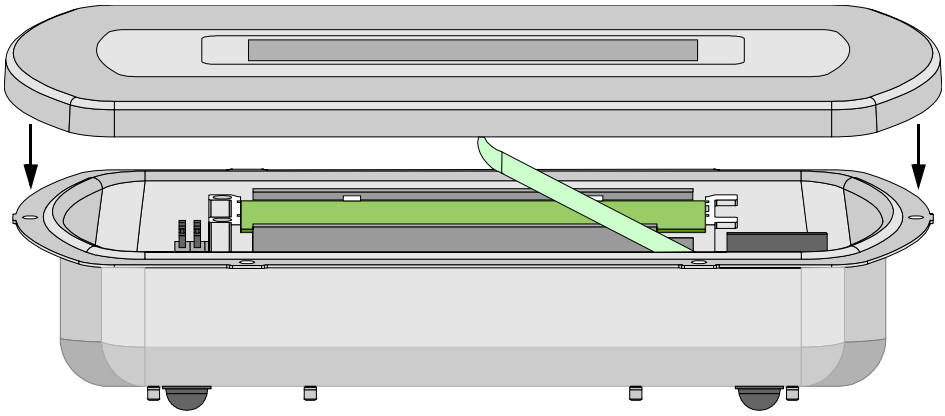
Insert the ribbon cable.



3.3.2 Replacing the enclosure cover

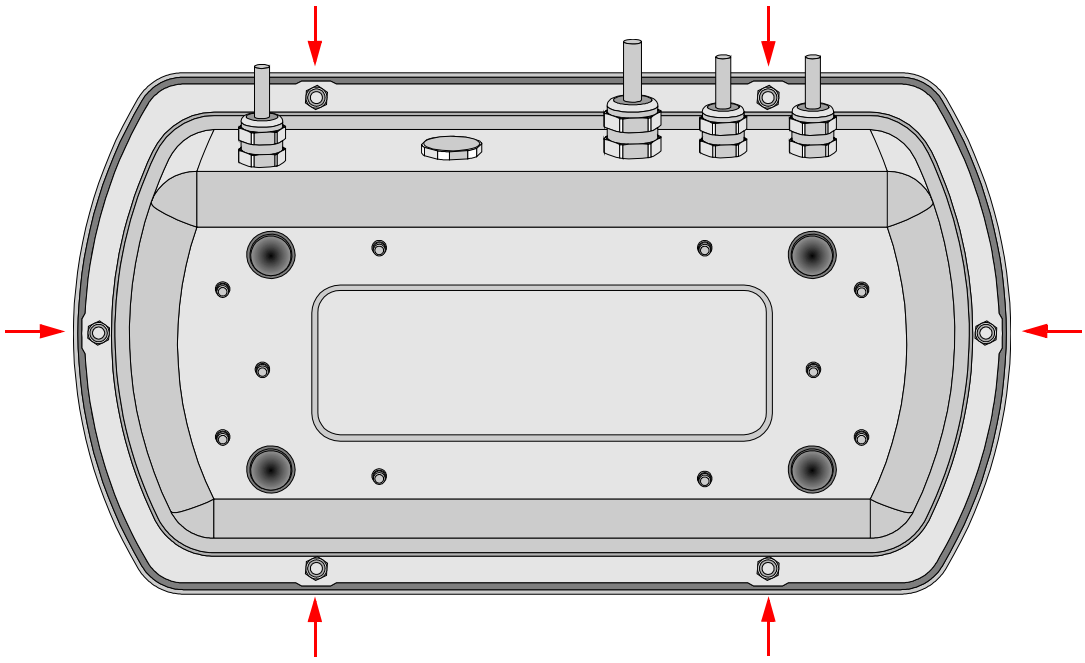
The keypad ribbon cable must lie freely in a loop between the enclosure cover and the main board. Do not bend or kink the cable.

Place the cover on the enclosure base.



Slide the threaded pins on the cover through the drilled holes of the gasket flange.

Screw the 6 M4 nuts onto the threaded pins on the device rear and tighten crosswise using a 7 mm socket wrench.



4.1 Safety information

To make the cable connections it is necessary to open the enclosure. Be sure to follow the instructions in Chapter 3 “Opening the enclosure“ on page 9.

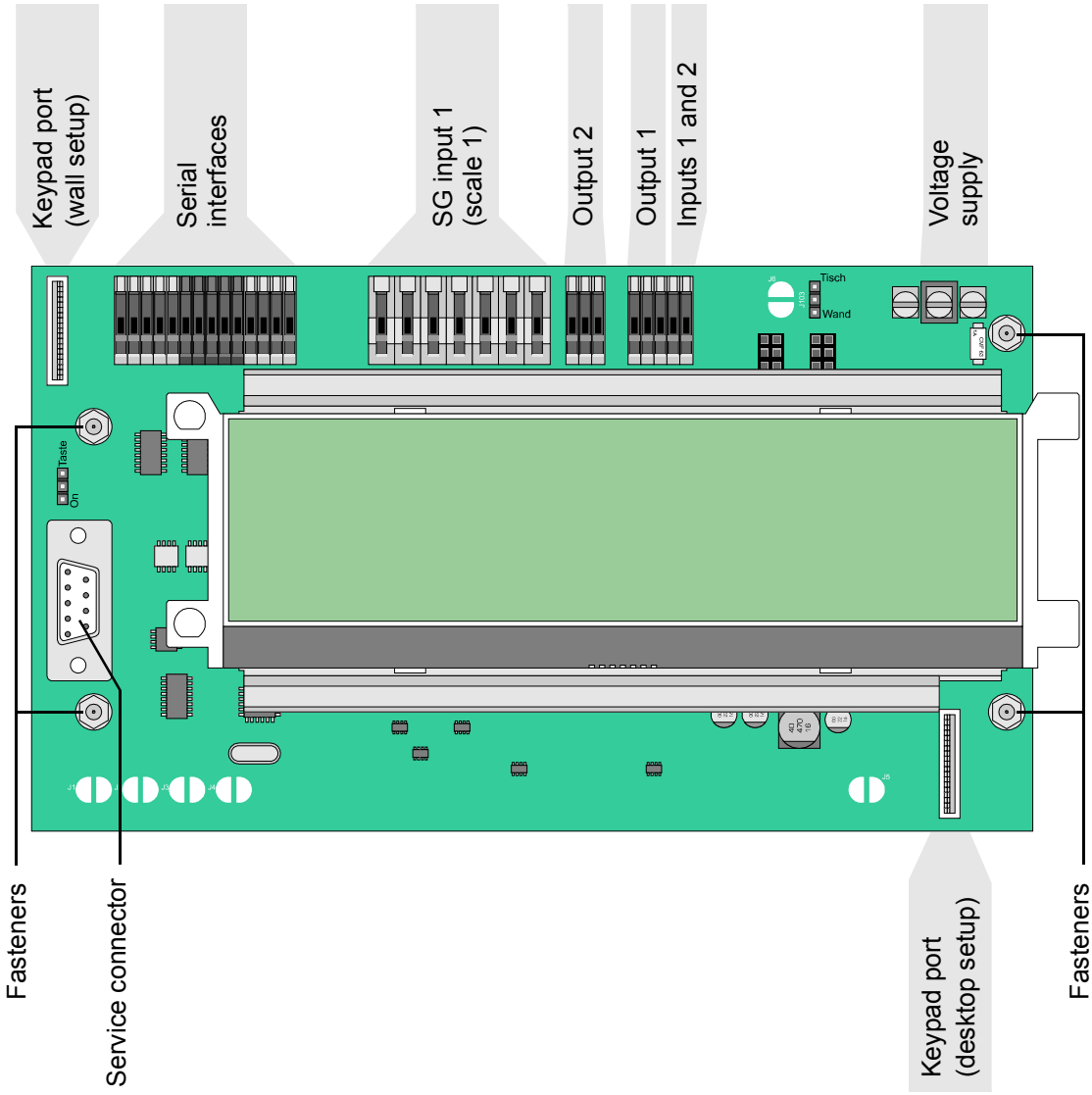
4.2 Connection position

The indicator can be used in two different positions (wall-mounted or on the desktop).

- When set up on the desktop, the terminals are located at the upper edge of the main board.
- When wall mounted, the device is installed the other way round and the terminals are then positioned at the lower edge of the board.

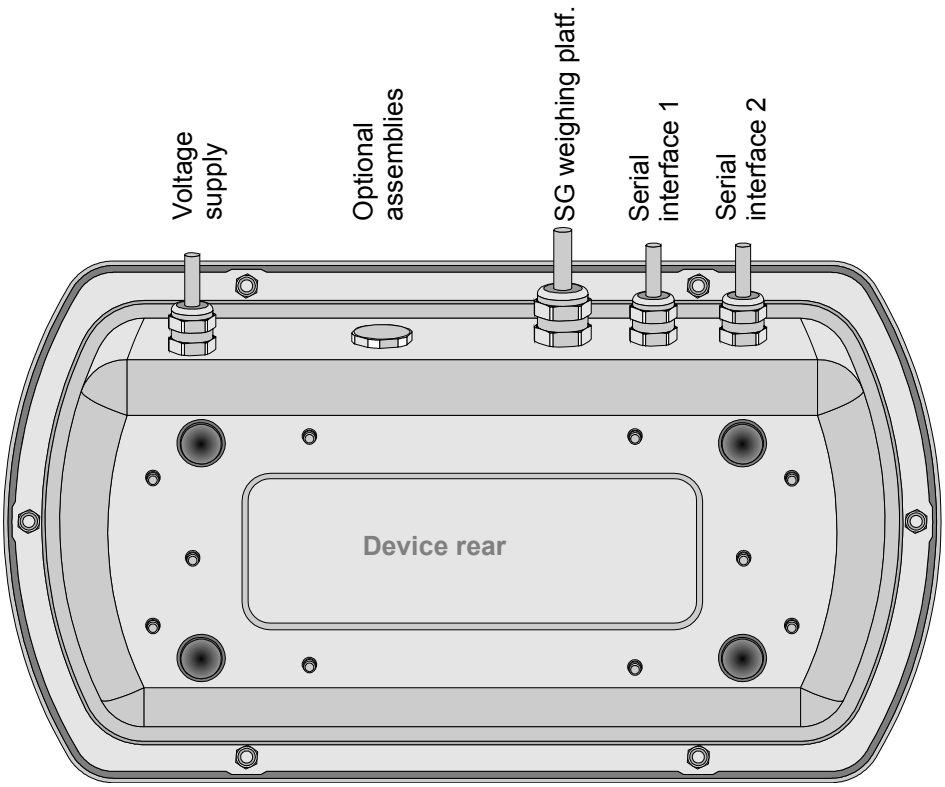
In this overview the positions of the terminals and plug-in connectors on the board refer to the desktop setup. When wall mounted, the positions are as rotated through 180°.

4.2.1 Main board



4.3 Enclosure cable glands

Standard cable gland configuration in conjunction with two serial interfaces.

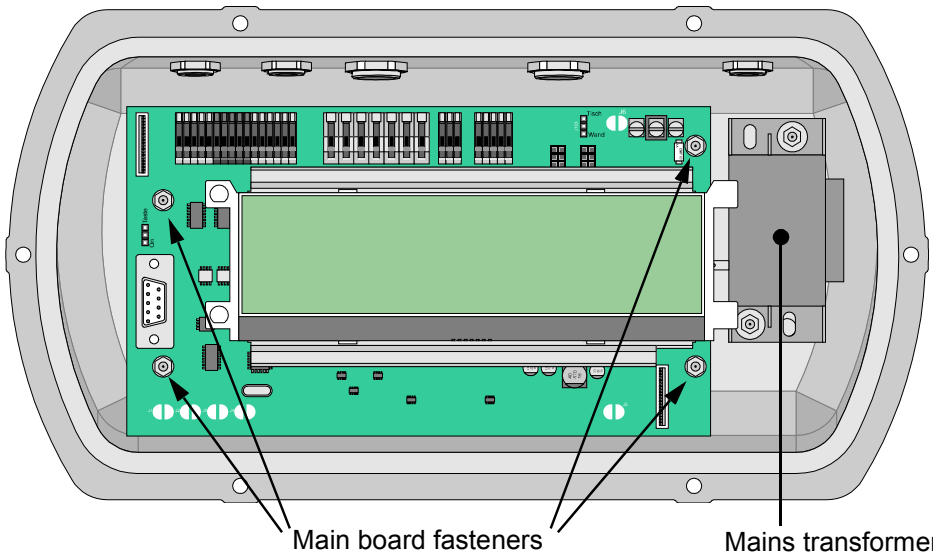


4.4 Voltage supply

When the device is shipped, all voltage supply connections have been prepared and made for the connection type ordered.

4.4.1 Mains connection

The indicator is supplied with voltage via an integral power supply unit.

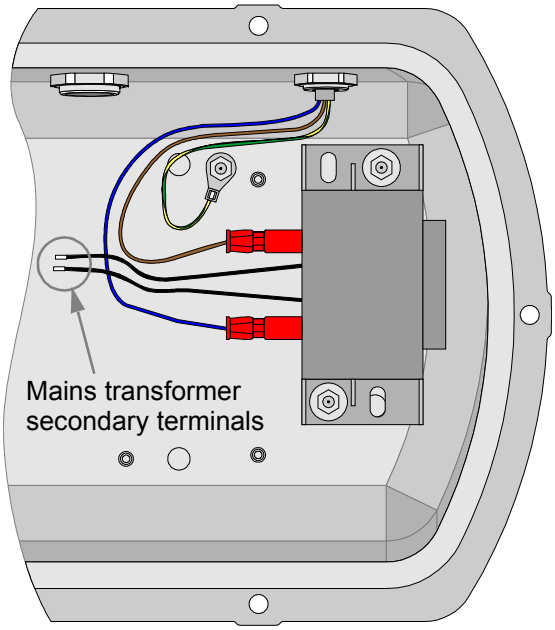


When replacing or connecting the mains cable, it is necessary to unscrew the four fastening nuts on the main board and take the board out of the enclosure. If cables have already been connected to the device's terminal strips, the board can also be carefully lifted up.

Connect the power cable straight to the flat connectors (2.8 x 0.8 mm) of the mains transformer using fully insulated quick disconnect terminals.

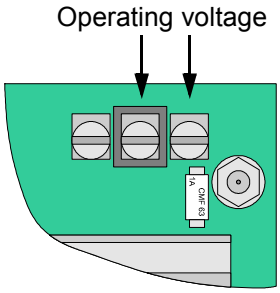
Use a ring terminal to connect the protective conductor to one of the threaded pins (M3) in the enclosure base.

A shielded power cable must be used. The cable shield must have contact inside the gland. See Chapter 8 “Cable gland assembly“ on page 37.



Connect the stranded wires for the secondary terminal of the mains transformer (12VAC/ 12VA) to the operating voltage terminals on the top right of the main board.

The third terminal there is reserved for optional assemblies and remains unused.



4.4.2 Extra-low voltage supply

Alternatively, the voltage supply to the main board can come from an external extra-low voltage source (12-15V AC or 12-24V DC, approx. 12 VA). For this the mains transformer must be removed and the mains cable replaced by a shielded voltage supply cable.
Operating voltage connection is reverse polarity protected. In conjunction with a direct current supply, there is therefore no need to check the polarity of the + and - terminals.

4.4.3 Battery operation

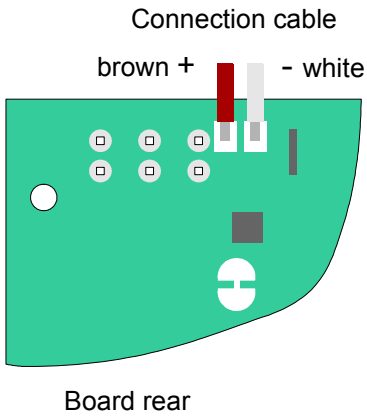
To operate the device with battery voltages from 10.5 V, it is possible to convert it to battery operation.

For this the mains transformer must be removed from the device and the mains cable replaced by a shielded battery connection cable.

To connect the cable, remove the main board from the enclosure.
Solder the battery connection cables to the two solder points on the rear of the board beneath the operating voltage terminals.

Ensure the polarity is correct!

The cable should be equipped with an external fuse (1A).
(indicated wire colours = original manufacturer's connecting cable)



To obtain a long operating time in battery mode, power consumption can be reduced automatically when the device is not in use or the device can be completely shut down. (See Chapter 25 "Battery operation" on page 105 and Chapter 26 "Display background light" on page 107)

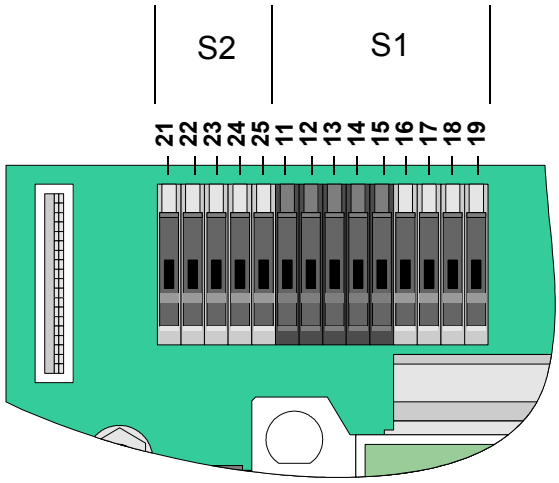
4.5 Serial interface

The indicator has two serial interfaces.

- Interface S1 is configured as an RS-232 interface as standard. Conversion to a TTY 20 mA interface is described in Chapter 4.5.2 “TTY at interface 1“ on page 20.
- Interface S2 is designed only an RS-232 interface.

Please note the instructions in Chapter 8 “Cable gland assembly“ on page 37 when installing shielded cables.

Serial interface	Terminal	Signal
S1 RS 232	11	TXD
S1 RS 232	12	RTS
S1 RS 232	13	RXD
S1 RS 232	14	CTS
S1 RS 232	15	GND
S1 TTY	16	RXD +
S1 TTY	17	RXD -
S1 TTY	18	TXD +
S1 TTY	19	TXD -
S2 RS 232	21	TXD
S2 RS 232	22	RTS
S2 RS 232	23	RXD
S2 RS 232	24	CTS
S2 RS 232	25	GND



Signal designation RS232

Indicator			Terminal equipment
Signal meaning	Signal name	Signal direction	Signal name
Transmitted data	TXD	⇒	RXD
Request to send	RTS	⇒	CTS
Received data	RXD	⇐	TXD
Clear to send	CTS	⇐	RTS
Ground	GND		GND
Chassis ground	CHGND		CHGND

4.5.1 Connection to a PC

The full configuration of all four signal lines using the hardware handshake (RTS/CTS) offers maximum transmission reliability and is the default factory configuration. This is the preferred connection option.

The choice of handshake is dependent upon the application software on the PC. Select the required cabling according to the data transfer setting options. Most applications use RTS/CTS lines for hardware handshaking. They can also remain connected when not in use and the data transfer is being controlled by Xon/Xoff software handshaking. If in doubt you can also use the mixed configuration RTS/CTS and DTR/DSR. This configuration should not be used as a rule, however.

a) RTS/CTS hardware handshaking

The PC uses RTS/CTS handshaking.

Indicator		Cable			PC		
Signal	S1 / S2 Terminal	Wire	9-pin female	25-pin female	9-pin male	25-pin male	Signal
CHGND	Gland	Shield	Chassis	Chassis	Chassis	Chassis	CHGND
TXD	11 / 21	—	2	3	2	3	RXD
RTS	12 / 22	—	8	5	8	5	CTS
RXD	13 / 23	—	3	2	3	2	TXD
CTS	14 / 24	—	7	4	7	4	RTS
GND	15 / 25	—	5	7	5	7	GND

b) DTR/DSR hardware handshaking

The PC uses DTR/DSR handshaking.

Indicator		Cable			PC		
Signal	S1 / S2 Terminal	Wire	9-pin female	25-pin female	9-pin male	25-pin male	Signal
CHGND	Gland	Shield	Chassis	Chassis	Chassis	Chassis	CHGND
TXD	11 / 21	—	2	3	2	3	RXD
RTS	12 / 22	—	6	6	6	6	DSR
RXD	13 / 23	—	3	2	3	2	TXD
CTS	14 / 24	—	4	20	4	20	DTR
GND	15 / 25	—	5	7	5	7	GND

c) RTS/CTS and DTR/DSR hardware handshaking

The PC uses both RTS/CTS and DTR/DSR handshaking.
This configuration can be used if it is not known whether RTS/CTS or DTR/DSR hardware handshaking is being used.
The handshake lines can be jumpered within the cable connector housing.

Indicator		Cable			PC		
Signal	S1 / S2 Terminal	Wire	9-pin female	25-pin female	9-pin male	25-pin male	Signal
CHGND	Gland	Shield	Chassis	Chassis	Chassis	Chassis	CHGND
TXD	11 / 21	—	2	3	2	3	RXD
RTS	12 / 22	—	8 6	5 6	8 6	5 6	CTS DSR
RXD	13 / 23	—	3	2	3	2	TXD
CTS	14 / 24	—	7 4	4 20	7 4	4 20	RTS DTR
GND	15 / 25	—	5	7	5	7	GND

d) XON/XOFF software handshaking

For XON/XOFF software handshaking only data lines are connected. The characters 0x11 and 0x13 cannot be transmitted as data, as the data flow is controlled using these characters. In general, only text should be transmitted using software handshaking, not control characters for a printer or data for a graphic.

This pin assignment cannot be used to configure the indicator via the PC CONFIG-SOFTWARE.

Indicator		Cable			PC		
Signal	S1 / S2 Terminal	Wire	9-pin female	25-pin female	9-pin male	25-pin male	Signal
CHGND	Gland	Shield	Chassis	Chassis	Chassis	Chassis	CHGND
TXD	11 / 21	—	2	3	2	3	RXD
RXD	13 / 23	—	3	2	3	2	TXD
GND	15 / 25	—	5	7	5	7	GND

4.5.2 TTY at interface 1

Interface 1 can also be operated as a TTY interface.
In this case the interface cable is connected at terminals 16 to 19.

Serial interface	Terminal	Signal	Signal meaning
S1 GND	15	GND	Ground
S1 TTY	16	RXD +	Receive line + (received data)
S1 TTY	17	RXD -	Receive line - (received data)
S1 TTY	18	TXD +	Transmit line + (transmitted data)
S1 TTY	19	TXD -	Transmit line - (transmitted data)

To ensure data is transferred correctly a suitable handshake must be selected. As the TTY interface does not support signal lines for hardware handshaking, either SoFT or NoHAND must be selected as the handshake.

Data terminal equipment (DTE) echo functions are not supported by the indicator. (If the echo function is active, the DTE (e.g. a large display) sends the data record received back to the indicator.) See Chapter 17 “Interfaces“ on page 67 for information on setting interface properties.

When connecting two devices via the TTY interface, set one device to ACTIVE and the other to PASSIVE. The selection of ACTIVE or PASSIVE depends on the data direction. Connect the transmit lines of the first device (TXD + and TXD -) to the receive lines of the second device (RXD + and RXD -).

The following pin assignments show the connection of both the transmit and receive lines in full.

Depending on the application, it is not necessary to connect all the lines (e.g. when sending data to a large display: in this case only the indicator's TXD transmit lines need to be connected).

a) Indicator [transmit passive] and [receive passive]

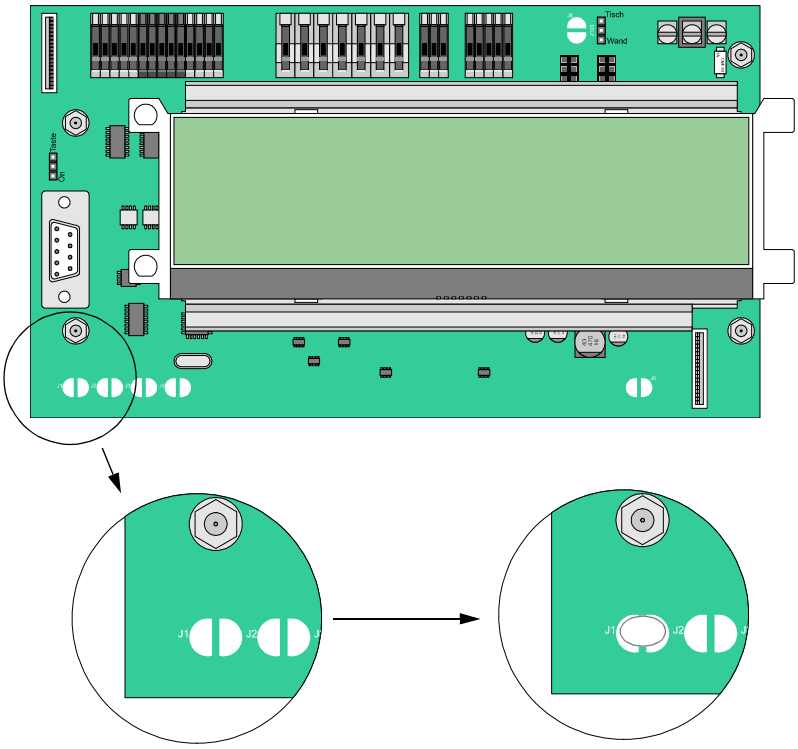
This connection method is the standard interface configuration.

Indicator				9 pin SubD	Cable	Data terminal equipment[a]		
Signal		Terminal	Current flow	Pin [b]	Wire	Signal direction	Signal	
Passive	RXD +	16	←	7	-	⇐	TXD +	Active
	RXD -	17	→	8	-		TXD return	
Passive	TXD +	18	←	5	-	⇒	RXD +	Active
	TXD -	19	→	4	-		RXD return	
	CHGND	Gland			Shield		CHGND	

a. For connection and configuration of the data terminal equipment, see equipment documentation.
b. Standard factory configuration.

b) Indicator [transmit active] and [receive active]

The connection type necessitates a change of jumper settings on the main board.



Default setting

J1 open (receive passive)
J2 open (transmit passive)

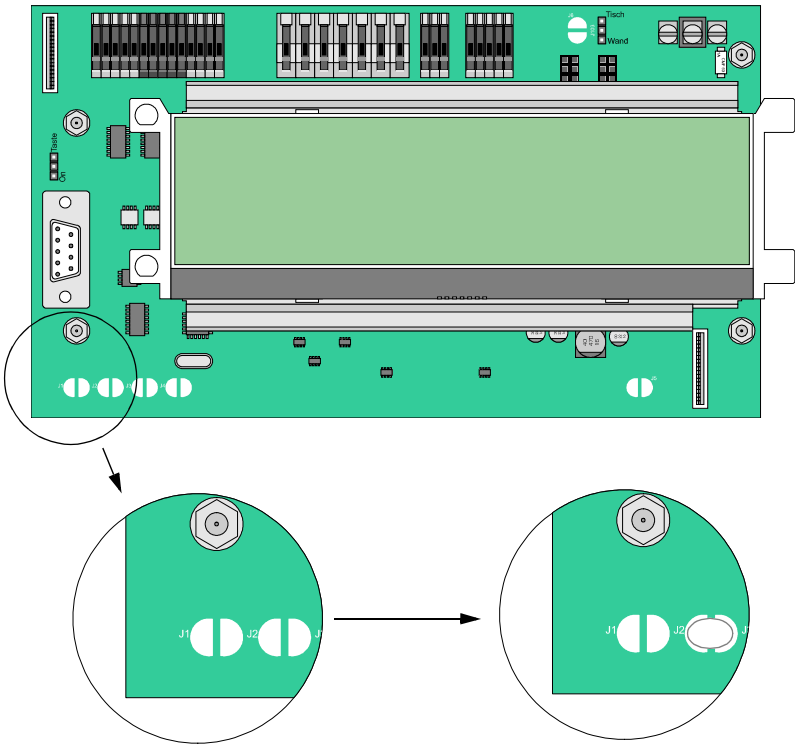
J1 solder up (receive active)
J2 open (transmit passive)

Indicator				9 pin SubD	Cable	Data terminal equipment[a]		
Signal		Terminal	Current flow	Pin [b]	Wire	Signal direction	Signal	
Active	RXD –	17	→	7	-	⇐	TXD +	Passive
	GND	15	←	8	-		TXD return	
Passive	TXD +	18	←	5	-	⇒	RXD +	Active
	TXD -	19	→	4	-		RXD return	
	CHGND	Gland			Shield		CHGND	

a. For connection and configuration of the data terminal equipment, see equipment documentation.
b. Standard factory configuration.

c) Indicator [receive passive] and [transmit active]

The connection type necessitates a change of jumper settings on the main board.



Default setting

J1 open (receive passive)
J2 open (transmit passive)

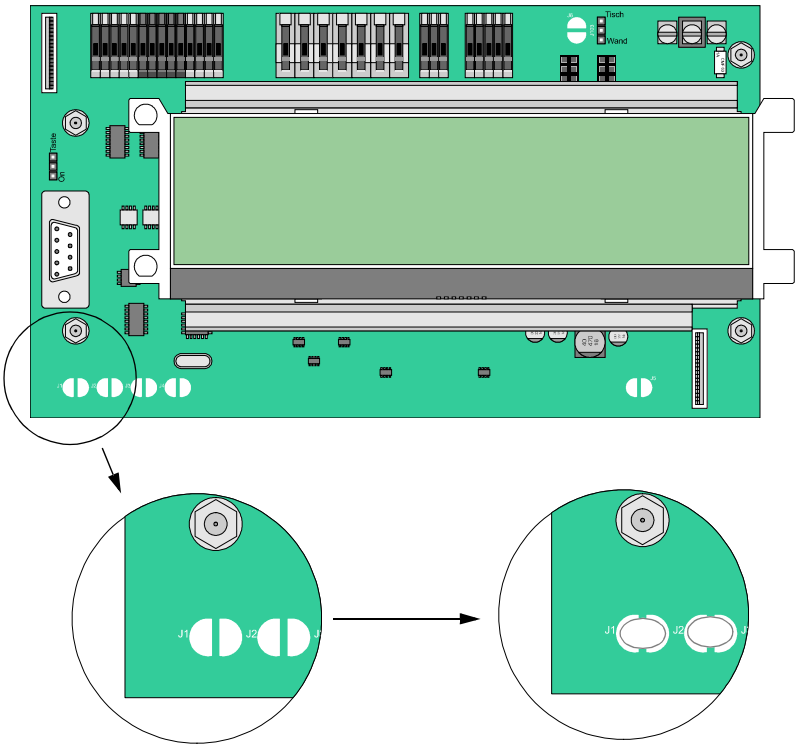
J1 open (receive passive)
J2 solder up (transmit active)

Indicator				9 pin SubD	Cable	Data terminal equipment[a]		
Signal		Terminal	Current flow	Pin [b]	Wire	Signal direction	Signal	
Passive	RXD +	16	←	7	-	⇐	TXD +	Active
	RXD -	17	→	8	-		TXD return	
Active	TXD -	19	→	5	-	⇒	RXD +	Passive
	GND	15	←	4	-		RXD return	
	CHGND	Gland			Shield		CHGND	

a. For connection and configuration of the data terminal equipment, see equipment documentation.
b. Standard factory configuration.

d) Indicator [receive active] and [transmit active]

The connection type necessitates a change of jumper settings on the main board.



Default setting

J1 open (receive passive)
J2 open (transmit passive)

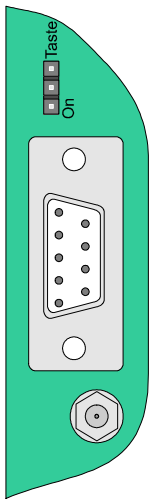
J1 solder up (receive active)
J2 solder up (transmit active)

Indicator				9 pin SubD	Cable	Data terminal equipment[a]		
Signal		Terminal	Current flow	Pin [b]	Wire	Signal direction	Signal	
Active	RXD –	17	→	7	-	⇐	TXD +	Passive
	GND	15	←	8	-		TXD return	
Active	TXD -	19	→	5	-	⇒	RXD +	Passive
	GND	15	←	4	-		RXD return	
	CHGND	Gland			Shield		CHGND	

a. For connection and configuration of the data terminal equipment, see equipment documentation.
b. Standard factory configuration.

4.6 Service connector

The service connector is used to configure the indicator. A direct connection to a PC RS-232 interface can be made using a serial extension cable (9-pin, configuration 1:1). A special service cable is not required. Using the PC CONFIG-SOFTWARE the indicator settings can be read, edited and sent back.



Indicator		Cable	PC	
Signal	Service connector	9-pin 1:1	9-pin service connector[a]	Signal
CHGND	Chassis	Shield	Chassis	CHGND
GND	5	-	5	GND
TXD	2	-	2	RXD
RTS	8	-	8	CTS
RXD	3	-	3	TXD
CTS	7	-	7	RTS

a. Socket on cable, plug on PC

The service connector is connected in parallel with interface S1 on the indicator. It can be used only if RS-232 has been selected as the interface type, see 17 “Interfaces“ on page 67. If another device is connected to interface S1, it must be disconnected when using the service connector.

If either of the S1 or S2 interfaces is run out from the terminal strip with all the lines for hardware handshaking (RTS/CTS), this connection may also be used instead of the service connector.

4.7 Digital inputs and outputs

4.7.1 Inputs

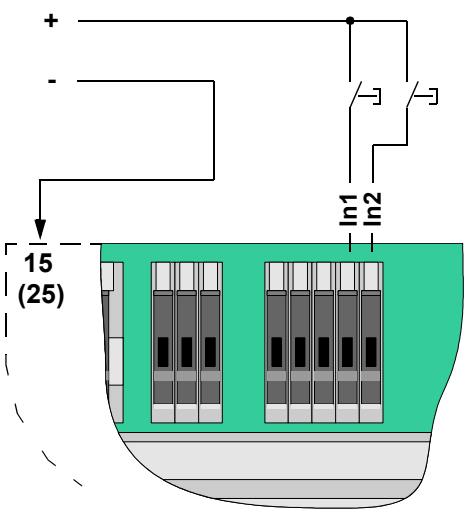
The indicator has two digital inputs.

In1 = Input 1
In 2 = Input 2

Signal level for signal LOW = 0 - 2 VDC
Signal level for signal HIGH = 5 - 24 VDC

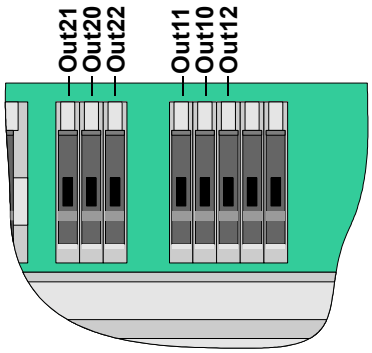
The ground for the inputs is GND on the main board, terminal 15 (or 25) of the serial interfaces.

Connection example



4.7.2 Outputs

The indicator has two digital outputs.



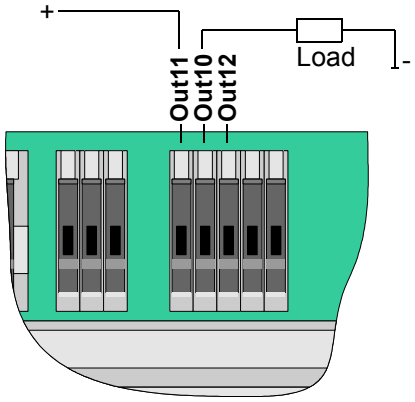
Out11 = Output 1a
Out10 = Output 1com
Out12 = Output 1b

Out21 = Output 2a
Out20 = Output 2com
Out22 = Output 2b

Each output is designed as a twin electronic relay. Depending on the method of connection, the voltage and current carrying capacities can vary. An external voltage supply is required to connect the outputs.

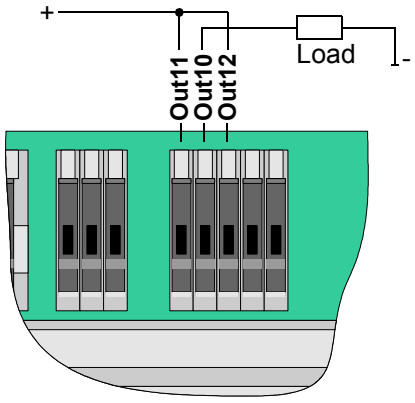
Connection options

The connection options under description relate to output 1. The same conditions apply for output 2.



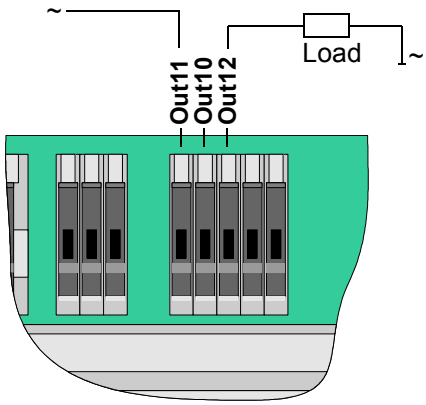
Switching voltage: **max. 50VDC**
Switching current: **max. 2.5A**
Internal resistance: max. 0.06 ohms when active.

Attention: An external surge suppressor is required in conjunction with inductive loads (free-wheeling diode, RC circuit, varistor).



Switching voltage: **max 50VDC**
Switching current: **max 5.0A**
Internal resistance: max. 0.03 ohms when active.

Achtung: An external surge suppressor is required in conjunction with inductive loads (free-wheeling diode, RC circuit, varistor).



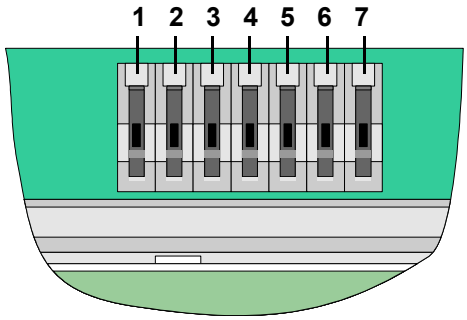
Switching voltage: **max 35VAC**
Switching current: **max 2.5A**
Internal resistance: max. 0.12 ohms when active.

Achtung: An external surge suppressor is required in conjunction with inductive loads (RC circuit, varistor).

5.1 Strain gauge input

A weighing platform with strain gauge load cells can be connected at the A/D converter input.

Terminal	Signal
1	Dongle
2	Supply +
3	Sense +
4	Signal +
5	Signal -
6	Sense -
7	Supply -

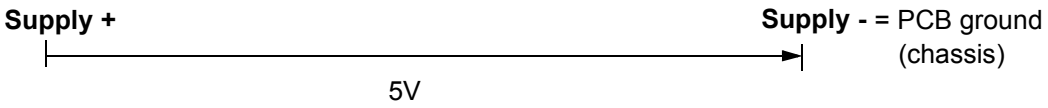


Terminal 1 of the weighing platform is connected only if a terminal box with DONGLE is used (dongle = device with unique identification number in the terminal box).

If no terminal box is used, or a terminal box without a DONGLE, the terminal is left unused.

The weighing platform feed voltage is 5V.

The following voltage is measurable:



In the event of a short circuit or supply voltage overload, an error message appears on the display and the device switches itself off after a short delay. See "Messages and errors" chapter in the Operating Manual.

5.2 Connecting the strain gauge weighing platform

5.2.1 Direct connection of a load cell

Please note the installation instructions for shielded cables in Chapter 8 “Cable gland assembly“ on page 37.

Indicator		6-wire load cell		4-wire load cell	
Signal	Terminal		Wire colour		Wire colour
Supply –	7	–			
Sense –	6	–	Wire colour:		Wire colour:
Signal –	5	–	according to the	–	according to the
Signal +	4	–	load cell type	–	load cell type
Sense +	3	–			
Supply +	2	–			
Dongle	1		free		free

In conjunction with load cells with **4-wire connection**, connect the **SENSE +** and **SENSE -** terminals on the terminal strip with the respective supply voltages **SUPPLY +** and **SUPPLY -**.

5.2.2 Connection via terminal box

The specified wire colours apply with respect to the original manufacturer cable between the indicator and the terminal box.

a) Terminal box with identification function

These terminal boxes are equipped with an electronic device (dongle). This device sends an ID number to the indicator permitting authoritative identification of the terminal box.

For the ID number to be transmitted correctly, the shield of the measuring cable must have contact in the gland both at the indicator and in the terminal box.

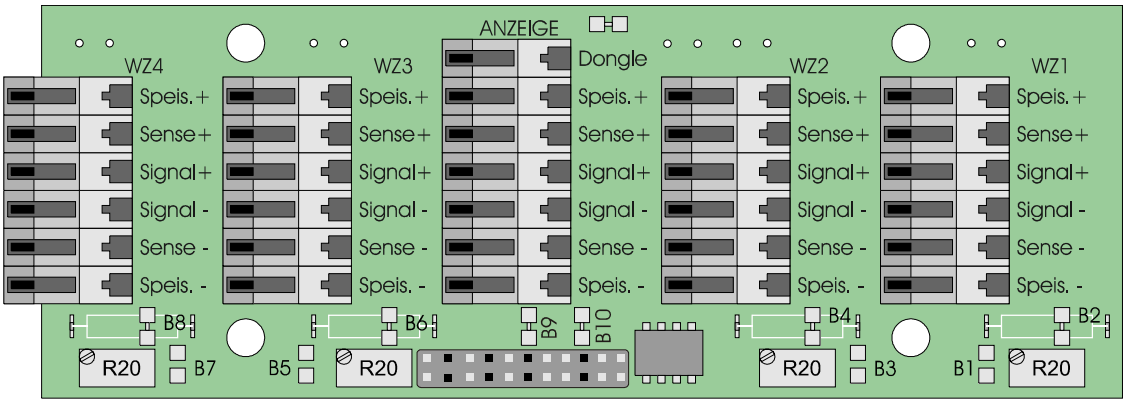
b) Terminal box without identification function

If older terminal boxes without a dongle or other makes are connected, terminal 1 at the strain gauge input of the indicator is left unused.

5.2.3 Terminal box with 6-wire connection

Please note the installation instructions for shielded cables in Chapter 8 “Cable gland assembly“ on page 37.

Indicator		Wire colour		Terminal box with identification function
Signal	Terminal	Cable black 6-way (no dongle)	Cable grey 7-way (with dongle)	6-wire connection Terminal strip DISPLAY
Supply –	7	Black	Yellow	Supply –
Sense –	6	Green	Pink	Sense –
Signal –	5	Orange	Brown	Signal –
Signal +	4	Brown	Green	Signal +
Sense +	3	Yellow	Grey	Sense +
Supply +	2	Red	White	Supply +
Dongle	1	–	Blue	Dongle



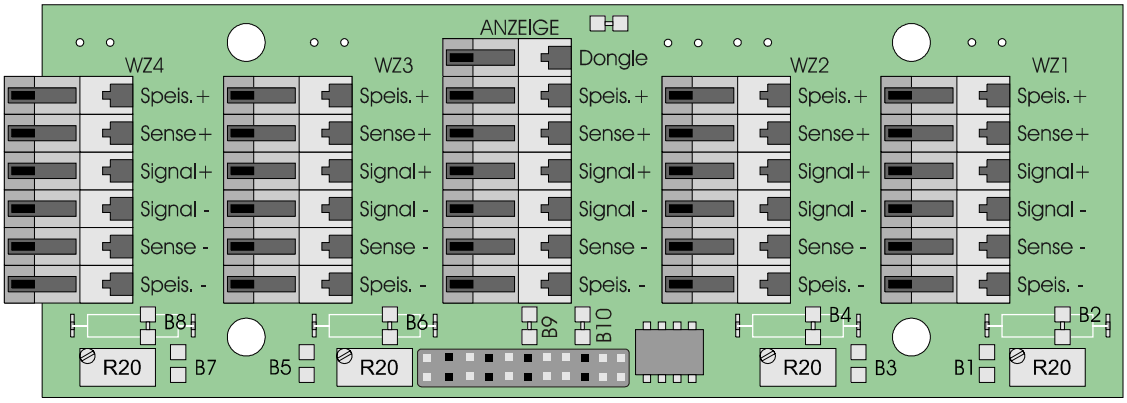
To include the weighing platform and the metal enclosure of the terminal box in the earthing system, the shield of the measuring cable must have contact inside the gland. If this connection is not made, the input of the analogue-to-digital converter could be destroyed by static discharge or overvoltage.

5.2.4 Connecting load cells in the terminal box

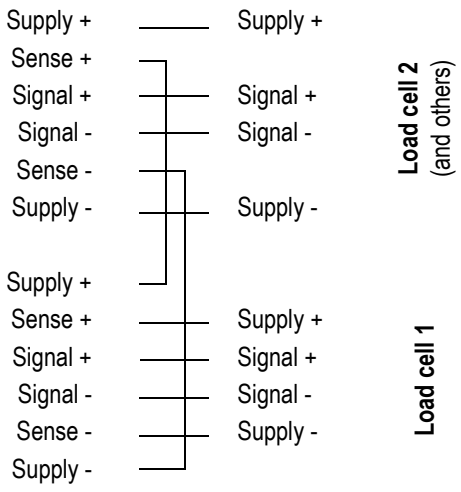
Please note the installation instructions for shielded cables in Chapter 8 “Cable gland assembly“ on page 37.

Terminal box Signal (Terminal)	6-wire load cell Wire colour	4-wire load cell Wire colour
Supply +	-	
Sense +	- Wire colour:	Wire colour:
Signal +	- according to the	- according to the
Signal -	- load cell type	- load cell type
Sense -	-	
Supply -	-	

In conjunction with load cells with **4-wire connection**, connect the **SENSE +** and **SENSE -** terminals on the terminal strip with the respective supply voltages **SUPPLY +** and **SUPPLY -**.



To avoid having to insert two cables in one terminal when connecting load cells with 4-wire connection, the cable jumpers can be configured according to the adjacent wiring diagram.
In this case load cell 1 is the only one to be connected at variance with the standard terminal designation.
As the terminals for the load cells in the terminal box are all connected in parallel, it is sufficient to make the two connections between supply and sense once.



5.3 Connection to the indicator

Load cells and terminal boxes can be connected to the indicator using circular connectors. The table shows the wire colours and pin assignments of the original manufacturer cables and connectors.

Please note the assembly instructions for circular connectors in Chapter 9 “Circular connector assembly“ on page 39.

Indicator		Wire colour		Connector		Terminal box or load cell
Signal	Terminal	Cable black 6-way	Cable grey 7-way	Pin no. Female	Pin no. Male	Signal
Supply –	7	Black	Yellow	4	4	Supply –
Sense –	6	Green	Pink	6	6	Sense –
Signal –	5	Orange	Brown	2	2	Signal –
Signal +	4	Brown	Green	3	3	Signal +
Sense +	3	Yellow	Grey	5	5	Sense +
Supply +	2	Red	White	1	1	Supply +
Dongle	1	—	Blue	7	7	Dongle [a]
CHGND	Gland	Shield	Shield	Chassis	Chassis	CHGND

a. Only when connecting a terminal box with identification function

5.4 Maximum cable length

The length of cable between the indicator and the terminal box or load cell depends upon the cross-section of the cable employed. The maximum length is 54.2 m per mm^2.

The maximum cable length for a cable cross-section of 0.25 mm^2, for example, is calculated as follows:

Cable length = Cross section x 54.2 $^{m}/_{mm^2}$

Cable length = 0.25 mm^2 x 54.2 $^{m}/_{mm^2}$

Cable length = 13.55 m

The cable cross-section to be used for a stipulated length of 80 m, for example, is calculated according to the following equation:

$$\text{Cross section} \geq \frac{\text{Cable length}}{54.2\ ^{m}/_{mm^2}}$$

$$\text{Cross section} \geq \frac{80\ \text{m}}{54.2\ ^{m}/_{mm^2}}$$

Cross section ≥ 1.47 mm^2 ~ (1.5 mm^2)

Table for conventional cable cross-sections

Cross section	Max. length	Cross section	Max. length
0.25 mm^2	13.5 m	0.6 mm^2	32.5 m
0.34 mm^2	18.4 m	0.75 mm^2	40.6 m
0.4 mm^2	21.6 m	1.0 mm^2	54.2 m
0.5 mm^2	27.1 m	1.5 mm^2	81.3 m

6.1 Overview

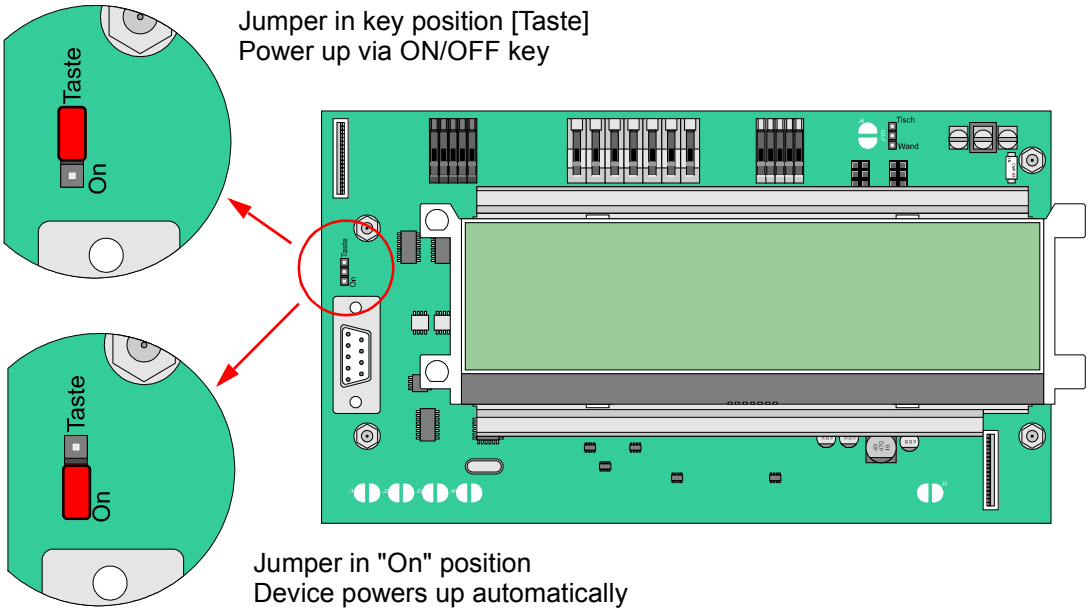
The AUTOMATIC POWER-UP function powers up the indicator automatically when the supply voltage (mains voltage or low voltage) is switched on. There is no need to press the ON/OFF key.

It is then no longer possible, however, to switch off the device using the ON/OFF key. The ON/OFF key therefore has to be disabled by a menu setting.

6.2 Jumper settings

Always follow the safety and assembly instructions in Chapter 3 “Opening the enclosure“ on page 9 when opening the device.

The main board has a pluggable jumper for selection of the power-up mode.

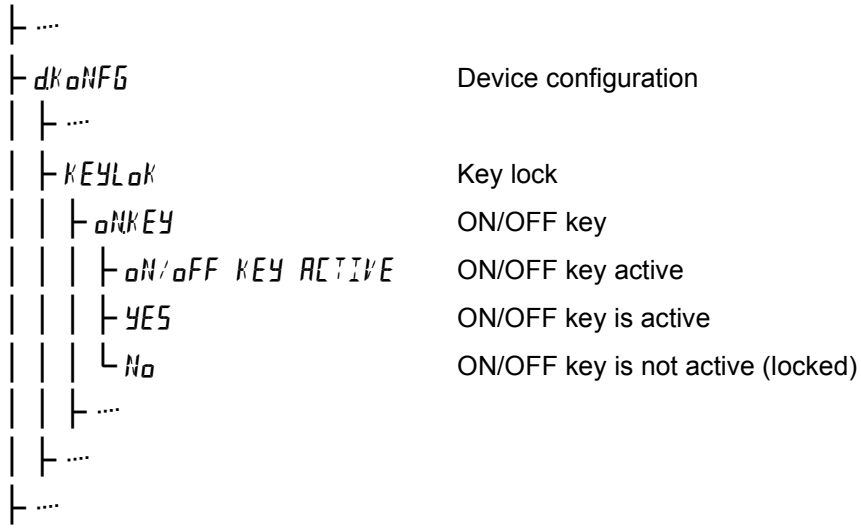


Jumper in key position [Taste]
Power up via ON/OFF key

Jumper in "On" position
Device powers up automatically

6.3 Menu structure

The ON/OFF key must be locked in the device configuration menu.

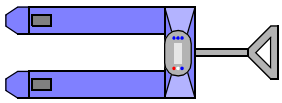


6.4 Menu table

Menu text	Default	Explanation
dKoNFG Device configuration		Enter menu with the ☰ key, select, dKoNFG and confirm.
****** Password	Manu-fac-turer's num-ber	Enter password and confirm by pressing 0+ ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 KEYLoK Key lock		Select menu item KEYLoK and confirm.
2 oNKEY ON/OFF key		Select menu item oNKEY and confirm.
3 oN/oFF KEY ACTIVE ON/OFF key active		Ticker text "ON/OFF key active" followed by YES/NO prompt.
3 YES No	YES	Select either YES or No using the T+ ↓ and ◎ ↑ keys and confirm. If YES is selected: ON/OFF key active If No is selected: ON/OFF key not active (locked) Select No and confirm.
2 oNKEY ON/OFF key		Exit menu with the ☰ key.

7.1 Overview

The MERCURY SWITCH function allows the indicator to be used in legal-for-trade (verifiable) mobile weighing instruments (e.g. pallet trucks). The mercury switch is installed in the frame of the weighing instrument and connected to an input on the indicator.



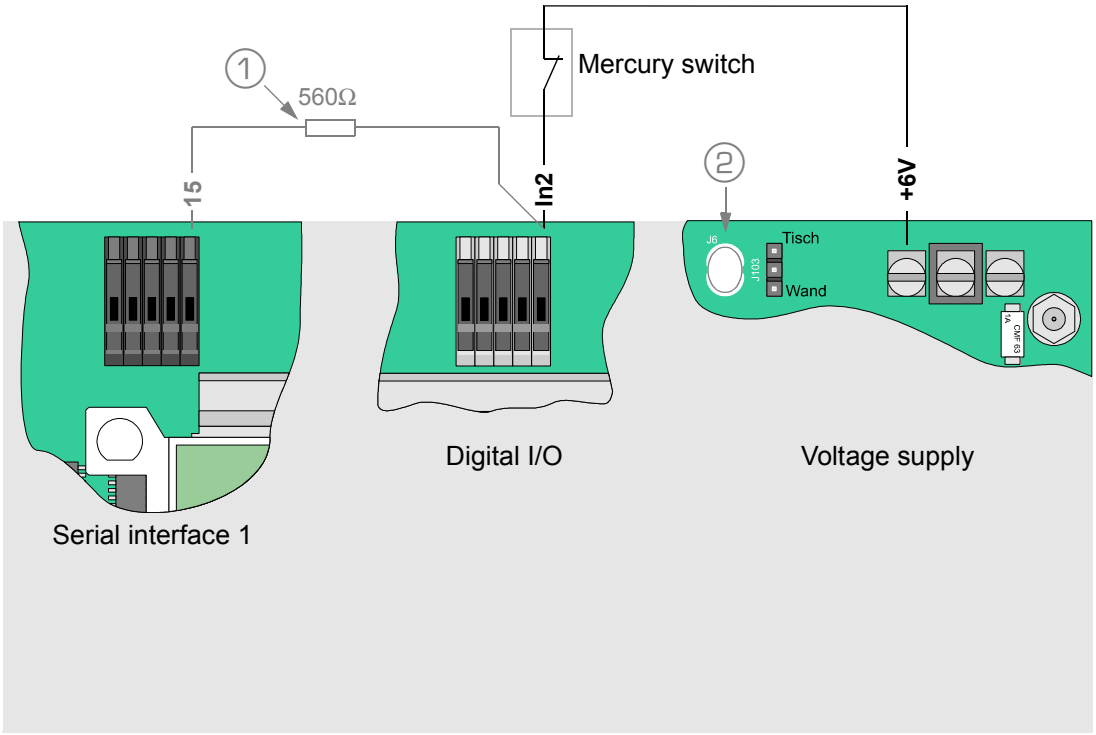
If the angle of tilt of the weighing instrument exceeds the permissible value, the mercury switch switches off and a series of dashes ------kg appear on the display instead of a weight value.

7.2 Connection

Always follow the safety and assembly instructions in Chapter 3 “Opening the enclosure“ on page 9 when opening the device.

The mercury switch must be closed in a vertical position. If the permitted angle is exceeded, the switch opens (normally closed contact).

The mercury switch is connected at +6V and input 1 (terminal In2).



1 From board number 070000 to 070999

To increase the current in the mercury switch, a 560Ω resistor must also be installed. Connect between input 1 (terminal In2) and ground (terminal 15). No solder connection is made at a jumper.

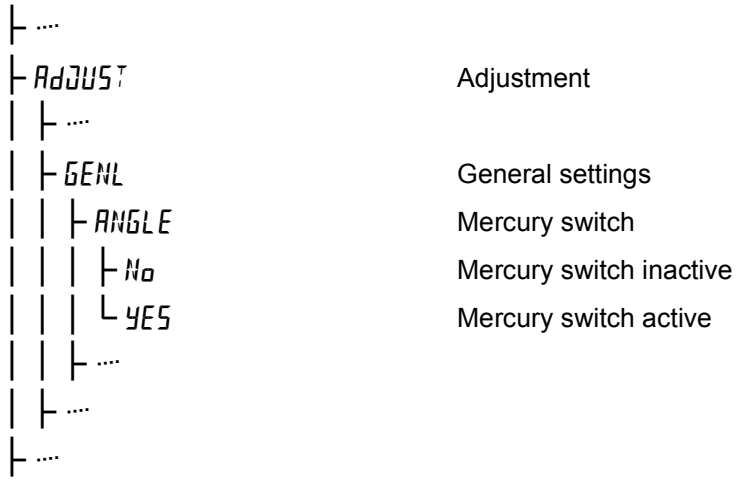
2 From board number 071000

No external resistor is required; simply make a solder connection at jumper J6.

7.3 Menu structure

The mercury switch has to be activated in the adjustment menu. The digital inputs and outputs do not have to be enabled in order to use the 'Mercury switch' option.

The settings can be changed only once the verification seal has been destroyed.



7.4 Menu table

Menu text	Default	Explanation
ADJUST Adjustment		Enter menu with the ☰ key, select ADJUST and confirm.
GENL General		Select menu item GENL and confirm.
ANGLE Mercury switch		Select menu item ANGLE and confirm.
No YES	No	Select either YES or No using the T↓ and ⓪↑ keys and confirm. If No is selected: mercury switch inactive If YES is selected: mercury switch active Select YES and confirm.
ANGLE Mercury switch		Exit menu with the ☰ key.

7.5 Additional function

Mercury switches are often used in mobile devices that can be battery-operated. If a printer is also connected to the indicator, it makes sense to shutdown the printer along with the indicator to extend the battery service life.

For this reason output 1 on the indicator is automatically set up as an auxiliary switch on activation of the mercury switch. The output is switched on and off whenever the indicator is switched on and off.

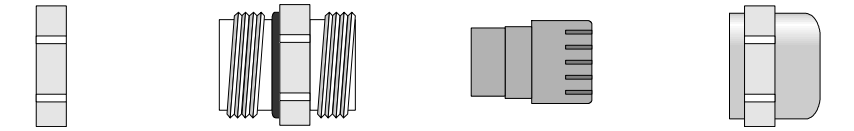
The output can be used to switch the printer operating voltage on and off automatically. See the "Pin assignment and connection" chapter for information on connecting the output.

All cables run into the enclosure must be round shielded cables.

The following cable diameters must be observed:

Gland type	Min. ∅ [mm]	Max. ∅ [mm]
M 12 (for data cables)	3.0	6.5
M 16 (for measuring cables)	4.0	8.0

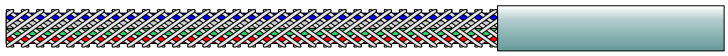
Individual parts



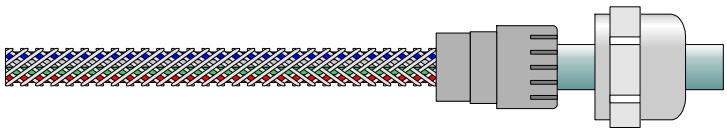
Locknut | Threaded nipple | Insert | Spring locknut

Assembly steps

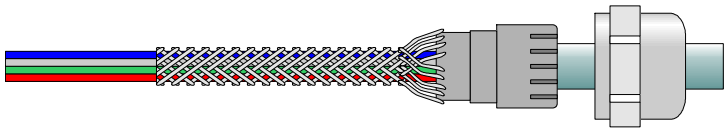
Strip approx. 100mm of insulation from the cable.



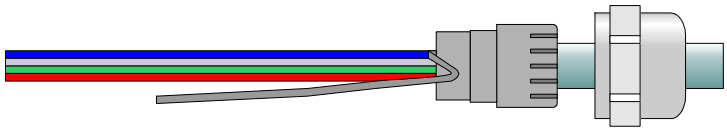
Thread on the spring locknut and the insert. Push the insert with gasket up onto the insulation.



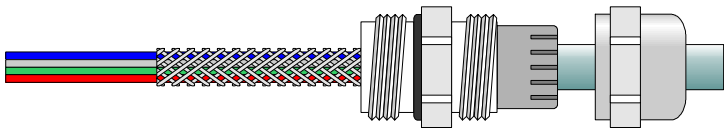
Spread out the braided shield a little and push back slightly.



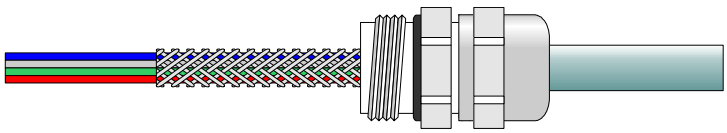
Cables with foil shield:
Remove foil and fold a small loop of the bare filler core back over the insert.



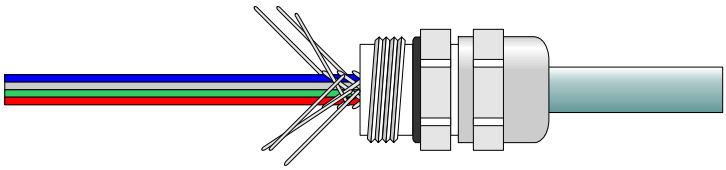
Thread on the nipple.
Push the nipple over the insert; the shield is clamped.
The braided shield must have contact all around the cable!
Push parts together.



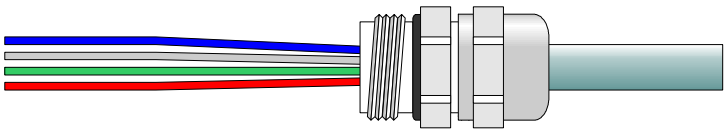
Screw the spring locknut tightly onto the threaded nipple.



Spread out the shield directly behind the threaded nipple.



Cut off the spread-out shield or, for cables with foil shield, the bare filler core.



Remove protective foil, if any.

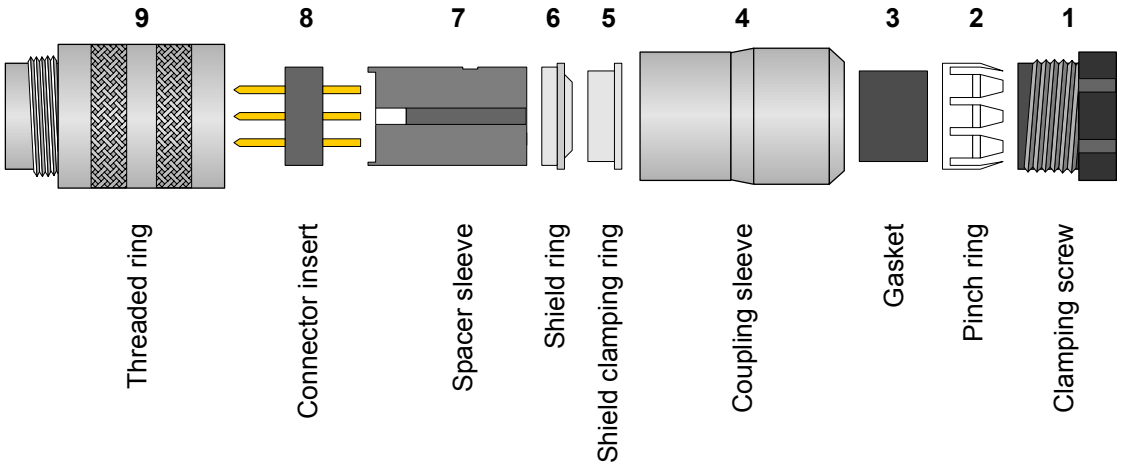
The cable shield is connected solely via contact in the gland.

IP67 rated circular connectors are used for making plug-in cable connections to the indicator. IP67 protection applies only on correct and careful assembly in accordance with the instructions given below.

All cables fitted in the plug-in connection must be round shielded cables.

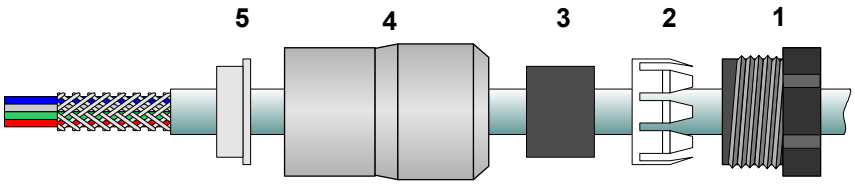
Cable diameter: min. 6 mm to max. 8 mm.

Individual parts

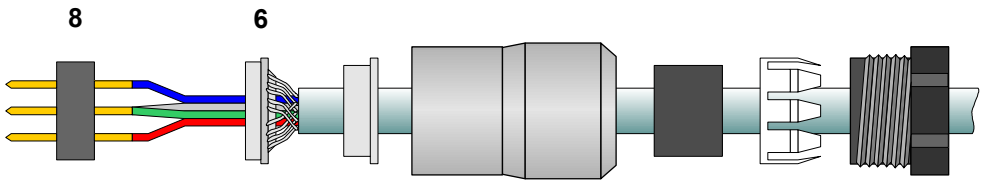


Assembly steps

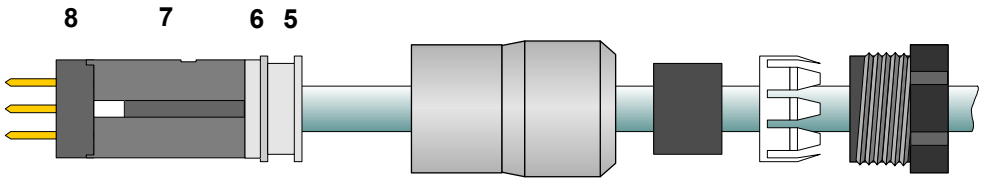
Strip approx. 20mm of insulation from the cable. Thread on parts 1-5.



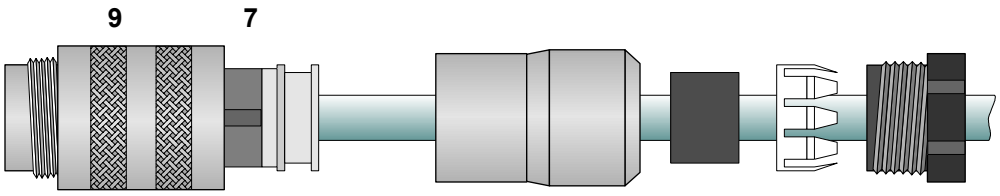
Spread out the shield and thread on shield ring (6), put the shield over the shield ring.
Remove 4mm of insulation from the wires and solder to connector insert (8).



Clamp the shield to shield ring (6) using clamping ring (5).
The shield must have contact all around the cable!
Snap on spacer sleeve (7).
Cut off the excess shield.

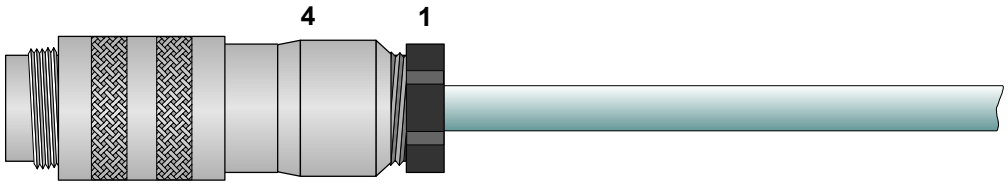


Push threaded ring (9) over connector insert (8) and spacer sleeve (7).
The locking element in threaded ring (9) must be seated in the corresponding grooves on connector insert (8) and the spacer sleeve.



Screw threaded ring (9) tight on coupling sleeve (4).

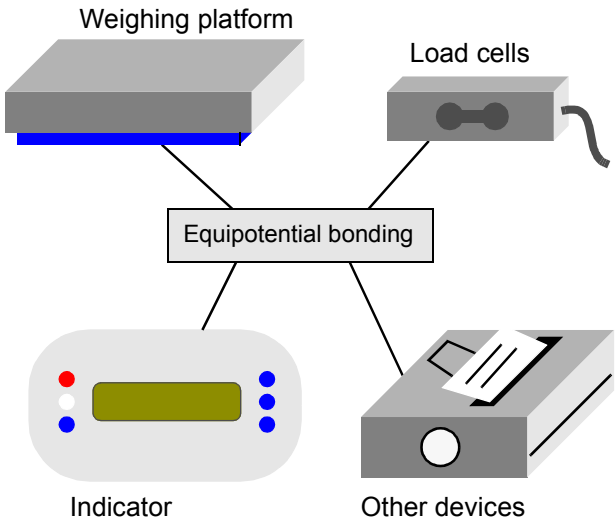
Push gasket (3) and pinch ring (2) into coupling sleeve (4) and screw together with spring locknut (4).



10.1 Connection concept

A weighing system connected to the indicator is protected against static discharge up to a peak voltage of at least 6 kV / 8 kV in accordance with DIN 45501, Sheet 3.3. In addition, the indicator complies with the immunity classes specified in the EU directives and European standards on which the CE mark is based. This level of guaranteed protection is sufficient for most weighing tasks.

If high static discharges occur in special applications, e.g. when processing (plastic) granules and free-flowing materials or when weighing plastics parts or film-wrapped packages, the weighing platform and the indicator must be provided with equipotential bonding in a star configuration. Any conveyors or fixtures attached on or to the weighing platform must be included in the equipotential bonding system. This will prevent the electronics from being destroyed by static discharges.



10.2 Weighing platform

The equipotential bonding connection on the weighing instrument frame must have good conductivity (<100mΩ) and a sufficient cross-sectional area. Locating and foot screws present in the frame may be used for this purpose.

If the weighing platform pan or frame is included in the equipotential bonding system, be sure to make a flexible connection. The equipotential bonding conductor must be laid in a loop. If this is not done, weighing errors will result!

10.2.1 Weighbridges

Equipotential bonding should be done via a foundation earth electrode or the weighbridge foundations.

The potentially large distance between weighing platform, indicator and other components can result in a big potential difference, compared with the measurement signal, between the components.

Therefore:

- Connect all components together using an equipotential bonding cable.
- Use a star configuration to connect components.
- Select a large cross-sectional area (min. 10^2 mm) for the equipotential bonding cable.
- Ensure there is a good conductive connection to the individual components (max. 100 mΩ).

10.2.2 Floor scales

Equipotential bonding should be done via a foundation earth electrode. To this end drill a hole through the foundations. Drive the foundation earth electrode into the soil.

The required length (insertion depth) of foundation earth electrode is dependent upon the local ground conditions. An electrician can provide information on this.

If the weighing platform is to be installed flush with the floor, the foundation earth electrode should be installed when the pit is made.

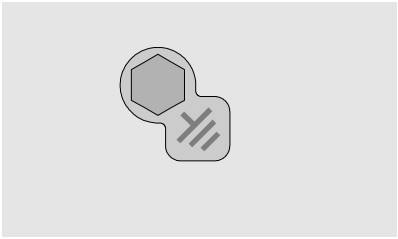
An existing protective conductor may be used only if equipotential bonding via a foundation earth electrode is not possible.

10.2.3 Bench scales

Connect all the weighing system components together. In exceptional cases, equipotential bonding can be done via the protective conductor of the Schuko socket outlet being used.

10.3 Indicator

Connection to the equipotential bonding system is effected on the rear of the indicator via the bolt and nut located there. Attention should be paid to making a low-ohm connection (<100 mΩ) with good conductivity and a large cross-section (e.g. using earth straps).



Connect all the weighing system components together. In exceptional cases, the earth connection can also be made via the protective conductor of the Schuko socket outlet being used.

10.4 Other devices

Printers and auxiliary devices often have correspondingly marked equipotential bonding terminals next to the data socket. Depending on the make, various connection options exist.

11.1 Menu levels

The device can be customised to the user's requirements in the dCoNFG menu (device configuration). The extensive setting options allow users to create operation sequences and assign and enter parameters for required functions.

Settings can be made only upon entry of a password. The standard password is the manufacturer's number for the indicator.

The device configuration menu includes the following settings:

├		See
├ dCoNFG		
│ ├ TARE	Set tare options	page 45
│ ├ SUM	Set memory accumulation options	page 47
│ ├ ANIMAL	Animal weighing	page 49
│ ├ diGI/o	Set up digital signals (separate password)	page 51
│ ├ ANALoG	Set up analogue output (with option board only)	
│ ├ STATIS	Set up statistics function (separate password)	page 61
│ ├ INFACE	Configure interface	page 67
│ ├ PRINT	Set print options	page 71
│ ├ AUTo o	Set automatic output options	page 95
│ ├ SETALI	Create alibi memory	page 99
│ ├ BAT.	Set up battery operation	page 105
│ ├ LIGHT	Switch display background light on/off	page 107
│ ├ KEYLoK	Set key lock options	page 109
│ ├ CLoCK	Change date and time	page 113
│ ├ PASSWd	Change password	page 115
│ ├ PCCoNF	Activate default settings for configuration with PC software	
│ ├ HARTEST	Hardware test	
│ └ BASSET	Default settings (restore factory settings)	
├		

11.2 Configuration using PC software

Device configuration parameters can be read out, edited and archived using PC configuration software. The software also allows the user to set and activate additional device properties and options that cannot be accessed via the indicator's device configuration menu.

The properties of these functions are described in this documentation.

Reference is made to the need for configuration using the PC software in the relevant chapters.

12.1 Set tare options

Tare options, such as the number of tare memories and auto tare, are set here. The settings are made in the TARE menu:

12.2 Menu structure

├	
├ dCoNFG	
│ ├ TARE	Set tare options
│ │ ├ NUMBER	Number of tare memories
│ │ │ ├ NUM 1	Number of tare memories = 1
│ │ │ └ NUM 2	Number of tare memories = 2
│ │ ├ AUTo.CL	Clear tare automatically
│ │ │ ├ No	Do not clear tare automatically on unloading the weighing instrument
│ │ │ └ YES	Clear tare automatically on unloading the weighing instrument
│ │ ├ AUTo.TA	Tare automatically
│ │ │ ├ No	Do not tare first load automatically
│ │ │ └ YES	Tare first load automatically
│ ├	
├	

12.3 Menu table

Menu text	Default	Explanation
dCoNFG Device configuration		Enter menu with the ☰ key, select dCoNFG and confirm.
****** Password	Manu-facturer's number	Enter the password and confirm by pressing →0← ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 TARE Tare		Select menu item TARE and confirm.
2 NUMBER Number of tare memories		Number of tare memories can be set.
3 NUM 2	1	Select either '1' or '2' using the →T← ↓ and ◎ ↑ keys and confirm. If the number of tare memories is set to 2, the first tare value will be stored in tare memory 1 and all subsequent values in tare memory 2.
2 AUToCL Clear tare automatically		Set options for automatic deletion of tare values
3 YES No	No	If YES is selected: all tare memories are erased when the weight value reaches zero (±5d). If No is selected: the tare value is not deleted automatically.
2 AUToTA Activate auto tare		Activates the auto tare function
3 YES No	No	If YES is selected: the first load placed on the weighing platform is tared automatically as soon as the indication is stable. If a weight value of 5d below the automatically tared weight value is obtained, the auto tare is deleted. If No is selected: auto tare is inactive.

13.1 Set accumulation memory options

Accumulation memory parameters such as auto print and auto delete are entered here.

13.2 Menu structure

├	
├ dCoNFG	
│ ├	
│ ├ SUM	Add together
│ │ ├ AUTo.ST	Automatic subtotal printout
│ │ │ ├ No	No automatic subtotal printout
│ │ │ └ YES	Automatic subtotal printout
│ │ ├ AUTo.CL	Automatic clear
│ │ │ ├ No	No automatic clear on printout of total
│ │ │ └ YES	Automatic clear on printout of total
│ │ ├ TARMEM	Save tare values
│ │ │ ├ No	Tare values are not totalled and printed.
│ │ │ └ YES	Tare values are totalled and printed.
│ │ └ ModE	Display mode after an addition
│ │ ├ NoNE	No display
│ │ ├ AddNS	Number of additions
│ │ ├ GRoSS	Gross total
│ │ ├ NET	Net total
│ │ ├ PIECES	Total quantity
│ │ └ MEMoRY	Memory name
│ ├	
├	

13.3 Menu table

Menu text	Default	Possible settings
dCoNFG Device configuration		Enter menu with the ☰ key, select D.Confi and confirm.
****** Password	Manu-facturer's number	Enter password and confirm by pressing 0+ ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
SUM Add together		Select SUM menu item using the T+ ↓ and ⊙ ↑ keys and confirm.
AUToST	No	Set automatic printout options
YES No		If YES: automatic ticket printout is activated. The subtotal is printed out after each addition. If No: automatic ticket printout is disabled.
AUToCL Automatic clear	No	On printout of the final total the accumulation memory is erased automatically
YES No		If YES: on printout of the final total the respective memory is erased. All other memories remain intact. If No: on printout of the final total the user can decide whether the respective memory is to be erased or not.
TARMEM Save tare	No	Save tare values in the totals.
YES No		If YES: the tare values are also added and printed. If No: the tare values are not added and printed.
ModE Display mode		After each addition, one of the following values from the accumulation memory can be displayed.
KEIN None		The display remains unchanged. No value is displayed.
AddNS Additions	AddNS	The number of additions performed in this memory is briefly displayed each time a value is added to the total.
GRoSS Gross		The gross total in this memory is briefly displayed each time a value is added to the total.
NET Net		The net total in this memory is briefly displayed each time a value is added to the total.
PIECES Quantity		The total quantity is briefly displayed each time a value is added to the total.
MEMoRY Memory name		The memory name is briefly displayed each time a value is added to the total.

14.1 Overview

The animal weighing function permits the weighing of live animals.

The indicator switches to a special weighing mode to deliver a stable indication in spite of the instability caused by the movement of the animals. The measuring time is user-selectable and can be adjusted to the period required for the animals to settle. Animals exhibiting agitated behaviour necessitate a longer measuring time.

A print ticket can be output on completion of weighing.

14.2 Menu structure

Option settings are made in the ANIMAL menu in the device configuration menu.

├	
├ dCoNFG	
│ ├	
│ ├ ANIMAL	Animal weighing
│ │ ├ ACTIVE	Activate animal weighing
│ │ │ ├ YES	Animal weighing active
│ │ │ └ No	Animal weighing inactive
│ │ ├ ME.TIME	Measuring time
│ │ │ └ 5	Time for one weighing operation (in seconds)
│ │ ├ dI.TIME	Display time
│ │ │ └ 5	Time for which the weighing result is displayed (in seconds)
│ │ └ CUSTPT	Custom animal weighing print ticket
│ │ └ _	Print ticket name (not specified = standard print ticket)
│ ├	
├	

14.3 Menu table

Menu text	Default	Explanation
dConFG Device configuration		Enter menu with the ☰ key, select dConFG and confirm.
****** Password	Manu-facturer's number	Enter password and confirm by pressing +0- ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 ANIMAL Animal		Select menu item ANIMAL and confirm.
2 ACTIVE Active		Activation of animal weighing. Confirm the display.
3 YES No	No	Select either YES or No using the →T← ↓ and ⊙ ↑ keys and confirm. If YES is selected: animal weighing mode active. If No is selected: animal weighing mode inactive.
2 MEASTIME Measuring time		Measuring time Confirm the display.
3 20	20	Set measuring time between 2 and 40 seconds. If a value greater than 40 is entered, the animal measuring time is set to 40 seconds.
2 DISPTIME Display time		Display time Confirm the display.
3 5	5	Set display time between 1 and 30 seconds. If a value greater than 30 is entered, the display time is set to 30 seconds.
2 CUSTPT Custom print ticket		Custom animal weighing print ticket.
3 10	Not specified	Enter and confirm the custom print ticket number (instruction block). (The number indicated here ['10'] is just an example.) The instruction block with the specified number must have been created on the indicator. If no number is specified, the standard ticket is printed out.
2 ACTIVE Active		Exit menu with the ☰ key.

15.1 Characteristics

To use the digital inputs and outputs you must first enable them by entering a board-specific enabling code. This code can be purchased from the manufacturer, quoting the board number.

The enabling code must be entered once only when first accessing the configuration level for the digital inputs and outputs. The functions thus enabled are then always available. The enabling code does not have to be entered again when you next access the configuration level.

The indicator has two inputs and two outputs, to which different characteristics can be assigned.

Depending on the configuration, the outputs assume the switching status corresponding to the current weighing instrument status or the current load immediately on device power up. Output activation or deactivation by keypress is not available in the standard function. The selected output switching function is continuously active.

15.1.1 Inputs

The inputs can be assigned the following functions:

a) Key assignment

An input can be assigned the same function as one of the keys on the device keypad.

The change of signal at an input from low (signal 0) to high (signal 1) is equivalent to a keypress on the device. If both inputs are connected, the function of the first incoming signal is executed. If no additional key functions are allowed while a device function is being executed, the signals are ignored.

The function of the ON/OFF key cannot be executed by an input.

15.1.2 Outputs

The digital outputs can be assigned the following functions:

a) Status output

The signal from an output is dependent upon the current weighing instrument operating condition. A user-selectable switching behaviour (NC contact/NO contact) can reverse the output signals.

NO contact

Weighing instrument status not reached = output low (signal 0)
Weighing instrument status reached = output high (signal 1)

NC contact

Weighing instrument status not reached = output high (signal 1)
Weighing instrument status reached = output low (signal 0)

If the indicator detects a stable indication, for example, the signal is emitted at the output set up for this status. Various status signals are possible.

b) Setpoint switch

The output signal changes when a user-selectable setpoint (target value) is reached.
A user-selectable switching behaviour (NC contact/NO contact) can reverse the output signals.

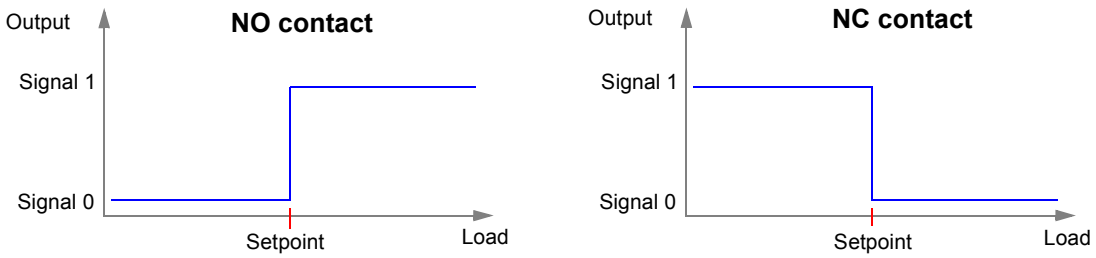
NO contact

Current load below the setpoint = output low (signal 0)
Current load above the setpoint = output high (signal 1)

NC contact

Current load below the setpoint = output high (signal 1)
Current load above the setpoint = output low (signal 0)

The setpoint reference (gross, net or quantity) can be selected.



c) Interval switch

The output signal changes when a user-selectable setpoint range is reached.
Unlike for the setpoint switch, two setpoints can be entered for a switching range (MIN and MAX).
The signal from an output is emitted only if the load is within the selected switching range (between MIN and MAX).

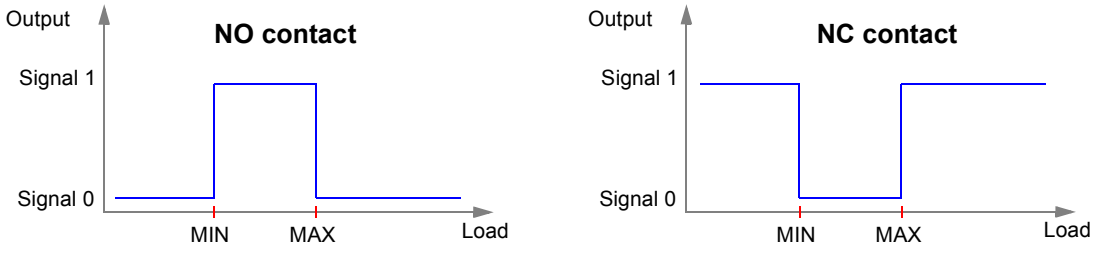
NO contact

Current load outside the range = output low (signal 0)
Current load within the range = output high (signal 1)

NC contact

Current load outside the range = output high (signal 1)
Current load within the range = output low (signal 0)

The setpoint reference (gross, net or quantity) can be selected.



Info: Setpoint or interval switches whose reference has been set to 'quantity' operate only if the count function is active.

d) Status link

The output functions SETPOINT SWITCH AND INTERVAL SWITCH can also be linked to a weighing instrument status. The output signal is emitted only if the load is within the selected switching range and the linked weighing instrument status has occurred.

Example:

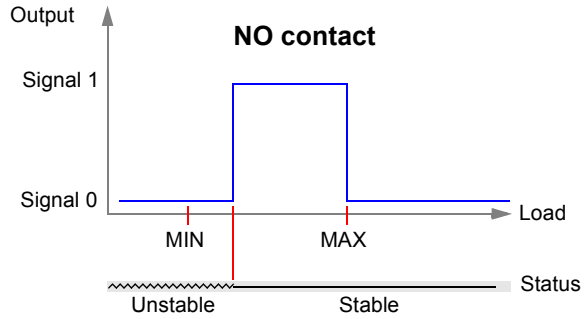
An output signal is to be emitted only if:

➔ the weight value on the weighing instrument is in a certain load range and

➔ the indication is stable.

The output is set as an INTERVAL SWITCH and linked to the status STABLE INDICATION.

This gives the following output signal:



The output signal is emitted only if the weight value is in the specified load range and the indication is stable.

Depending upon the switching task, various SETPOINT SWITCHES and INTERVAL SWITCHES can be linked to a weighing instrument status.

Not all combinations produce expedient switching behaviour, however. Were the INTERVAL SWITCH shown in the example to be linked to the status ZERO POSITION, the output would not be able to switch. The specified load range cannot be achieved at the same time as the zero position.

15.2 Signal level

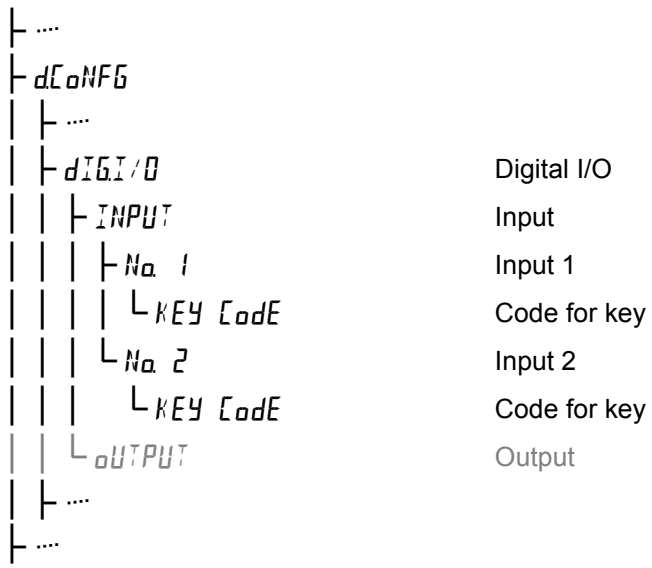
Voltage		Input
0 - 2 V	=	Signal 0 (Low)
5 - 24 V	=	Signal 1 (High)

Output		Voltage
Signal 0 (Low)	=	GND
Signal 1 (High)	=	V+

15.3 Defining inputs

Input characteristics can be set on the menu level dIGI/O in the device configuration menu.

15.3.1 Menu structure



15.3.2 Menu table

Menu text	Default	Explanation
dCoNFG Device configuration		Enter menu with the ☰ key, select dCoNFG and confirm.
****** Password	Manu-factu-rer's number	Enter the manufacturer's number as the password and confirm by pressing +0- ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 dIGI/O Digital I/O		Select menu item dIGI/O and confirm.
2 INPUT Input		Select menu item INPUT and confirm
3 No. 1 Input no. 1		Select the number of the input to be set and confirm.
4 KEY CodE Code for key 0	0 (0 = no function)	Ticker text "Code for key" Enter the code for the key whose function is to be assigned to this input. Confirm the code entered. See 15.3.3 "List of possible key assignments" on page 55 for the key code assignments.
2 INPUT Input		Exit the menu by pressing the menu key ☰.

All key functions of the device keypad (with the exception of the ON/OFF key) can be assigned to an input. Setting up a key lock in the device configuration menu will not affect the function of the inputs. The key lock merely disables the keys on the device keypad.

15.3.3 List of possible key assignments

Key	Code	Key function
None	**0**	No key function
	36	Menu key
	26	Information key
	1	Print
	19	Tare
	25	Zero
	22	Count with known initial quantity
	23	Count with known reference weight
	16	Add together
	13	Preset tare
	3	Number key 0
	9	Number key 1
	10	Number key 2
	11	Number key 3
	18	Number key 4
	28	Number key 5
	29	Number key 6
	24	Number key 7
	34	Number key 8
	35	Number key 9
	4	Decimal point
	5	Clear last entry
	12	Clear entry or function
	6	Enter or confirm key

15.4 Defining outputs

Output characteristics can be set on the menu level dIGI/O in the device configuration menu.

15.4.1 Menu structure

├	
├ dCoNFG	
│ ├	
│ ├ dIGI/O	Digital I/O (enabling code must be entered on initial invocation)
│ │ ├ INPUT	Input
│ │ └ oUTPUT	Output
│ │ ├ No. 1	Output 1
│ │ │ ├ oFF	Off (output has no function)
│ │ │ ├ STATUS	Status (output has function of status output)
│ │ │ │ ├ BEHVR	Behaviour
│ │ │ │ │ └ NoRMALLY oPEN	NO contact (Yes/No = NO contact/NC contact)
│ │ │ │ └ STATId	Status number (status characteristic)
│ │ │ ├ TARGET	Setpoint (output has function of setpoint switch)
│ │ │ │ ├ BEHVR	Behaviour
│ │ │ │ │ └ NoRMALLY oPEN	NO contact (Yes/No = NO contact/NC contact)
│ │ │ │ ├ ABSoLU.	Absolute (algebraic sign ignored)
│ │ │ │ │ ├ YES	Yes (setpoint also refers to negative net values)
│ │ │ │ │ └ No	No (setpoint refers to positive net values only)
│ │ │ │ ├ REF	Reference (setpoint reference: net, gross, quantity)
│ │ │ │ ├ TARGET	Setpoint
│ │ │ │ └ RSHIP	Status link (additional switching condition)
│ │ │ └ RANGE	Interval (output has function of interval switch)
│ │ │ ├ BEHVR	Behaviour
│ │ │ │ └ NoRMALLY oPEN	NO contact (Yes/No = NO contact/NC contact)
│ │ │ ├ ABSoLU.	Absolute (algebraic sign ignored)
│ │ │ │ ├ YES	Yes (setpoint also refers to negative net values)
│ │ │ │ └ No	No (setpoint refers to positive values only)
│ │ │ ├ REF	Reference (setpoint reference: net, gross, quantity)
│ │ │ ├ MIN	Min. setpoint (lower switching threshold)
│ │ │ ├ MAX.	Max. setpoint (upper switching threshold)
│ │ │ └ RSHIP	Status link (additional switching condition)
│ │ └ No. 2	Output 2
│ │ ├	(menu levels as for output 1)
│ ├	
├	

15.4.2 Menu tables

a) Output as status output

Menu text	Default	Explanation
dCoNFG Device configuration		Enter menu with the ☰ key, select dCoNFG and confirm.
****** Password	Manu-factu-rer's number	Enter the manufacturer's number as the password and confirm by pressing 0↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 dIGI/O Digital I/O		Select menu item dIGI/O and confirm.
2 oUTPUT Output		Select menu item oUTPUT and confirm
3 No. 1 Output no. 1		Select the number of the output to be set and confirm.
4 STATUS Status	oFF	Select function STATUS and confirm
5 BEHAV Behaviour		Output switching behaviour. Confirm the display.
6 NORMALLY OPEN NO contact YES No	YES	Ticker text "NO contact" followed by Yes/No prompt. YES = NO contact No = NC contact
5 STATId Status no.		Number of the desired status output. Confirm the display.
6 0	0	Enter status number and confirm: See "List of possible status outputs" on page 57 for the status number assignments.
5 BEHAV Behaviour		Exit the menu by pressing the menu key ☰.

List of possible status outputs

Status	Code	Function
Zero	**0**	Weighing instrument is at zero
Stable	**1**	Weighing instrument is at rest
Tare	**2**	Weighing instrument has been tared (active tare available)

b) Output as setpoint switch

Menu text	Default	Explanation
dCoNFG Device configuration		Enter menu with the ☰ key, select dCoNFG and confirm.
****** Password	Manu-factu-rer's number	Enter the manufacturer's number as the password and confirm by pressing ⊕↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
dIGI/O Digital I/O		Select menu item dIGI/O and confirm.
oUTPUT Output		Select menu item oUTPUT and confirm
No. 1 Output no. 1		Select the number of the output to be set and confirm.
TARGET Setpoint	oFF	Select function TARGET and confirm.
BEHVR Behaviour		Output switching behaviour. Confirm the display.
NoRMALLY oPEN NO contact YES No	YES	Ticker text "NO contact" followed by Yes/No prompt. YES = NO contact No = NC contact
ABSoLU Absolute		Absolute value not taking into account the algebraic sign. Confirm the display.
YES Yes No No	YES	YES = Setpoint also refers to negative net values (e.g. used for discharge weighing). No = Setpoint refers to positive values only (negative net values do not trigger a signal change).
REF Reference		Setpoint reference variable. Confirm the display.
1	1	Enter reference number and confirm. See "List of possible references" on page 59 for the reference assignments.
TARGET Setpoint		Sets the setpoint. Confirm the display.
1	1	Enter the setpoint and confirm (entry in the unit of the weighing platform when entering a weight value).
RSHIP Status link		Assigns a link to a weighing instrument status. Confirm the display.
0	0	Enter link number and confirm. See "List of possible status links" on page 59 for assigning status links.
BEHVR Behaviour		Exit the menu by pressing the menu key ☰.

List of possible references

Status	Code	Function
Net	**0**	Setpoint refers to the net weight
Gross	**1**	Setpoint refers to the gross weight
Quantity	**2**	Setpoint refers to the quantity (net)

List of possible status links

Status link	Code	Function
No status link	**0**	Not linked to a particular status
AND zero	**1**	Load in set switching range and instrument at zero
AND stable	**2**	Load in set switching range and indication stable
AND tare	**3**	Load in set switching range and instrument tared
AND NOT zero	**4**	Load in set switching range and instrument not at zero
AND NOT stable	**5**	Load in set switching range and indication not stable
AND NOT tare	**6**	Load in set switching range and instrument not tared

c) Output as interval switch

Menu text	Default	Explanation
dConFG Device configuration		Enter menu with the ☰ key, select dConFG and confirm.
****** Password	Manu-facturer's number	Enter the manufacturer's number as the password and confirm by pressing →0← ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 dIGI/O Digital I/O		Select menu item dIGI/O and confirm.
2 oUTPUT Output		Select menu item oUTPUT and confirm
3 No. 1 Output no. 1		Select the number of the output to be set and confirm.
4 RANGE Interval	oFF	Select function RANGE and confirm
5 BEHAV Behaviour		Output switching behaviour. Confirm the display.
6 NoRMALLY oPEN NO contact YES No	YES	Ticker text "NO contact" followed by Yes/No prompt. YES = NO contact No = NC contact

Menu text	Default	Explanation
☞ ABSoLU Absolute		Absolute value not taking into account the algebraic sign. Confirm the display.
☞ YES Yes No No	YES	YES = Setpoint also refers to negative net values (e.g. used for discharge weighing) No = Setpoint refers to positive values only (negative net values do not trigger a signal change).
☞ REF Reference		Setpoint reference variable. Confirm the display.
☞ 1	1	Enter reference number and confirm. See "List of possible references" on page 59 for the reference assignments.
☞ MIN MIN		Sets the switching range lower limit. Confirm the display.
☞ 1	1	Enter lower limit and confirm (entry in the unit of the weighing platform when entering a weight value).
☞ MAX MAX		Sets the switching range upper limit. Confirm the display.
☞ 10	10	Enter upper limit and confirm (entry in the unit of the weighing platform when entering a weight value)
☞ R.SHIP Status link		Assigns a link to a weighing instrument status. Confirm the display.
☞ 0	0	Enter status link number and confirm. See "List of possible status links" on page 59 for assigning links.
☞ BEHAV Behaviour		Exit the menu by pressing the menu key ☰.

16.1 Characteristics

To use the statistics function, you have to enable it by entering a board-specific enabling code. This code can be purchased from the manufacturer, quoting the board number.

The enabling code must be entered once only when first accessing the configuration level for the statistics function. The functions thus enabled are then always available. The enabling code does not have to be entered again when you next access the configuration level.

16.2 Method of operation

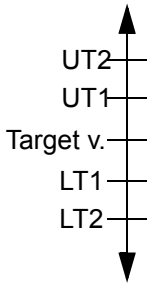
Packaged products must comply with specific net quantity requirements. The permissible tolerance limits for the various sizes of container are laid down in the relevant weights and measures regulations for packaged goods.

The statistics function permits product weights to be measured and assessed in accordance with the relevant weights and measures regulations for packaged goods. Monitoring and evidence of compliance with the required tolerance limits is provided by statistical analysis.

- The properties of the product to be checked are set on the indicator. The parameter set includes the nominal quantity, the tolerance limits and the product packaging weight (tare). The tolerance limits are automatically calculated with regard for the nominal quantity in accordance with the weights and measures regulations.
- Each sample weighed is compared with the parameters set to check whether the mandatory limits are complied with. If the weight is above/below the set tolerance limits, it is indicated accordingly and can also be printed.
- During the final statistics memory analysis, the results of the check and the statistical values calculated are printed out.

16.3 Target value and tolerance limits

On entry of the target value (nominal quantity), the tolerance limits are automatically recalculated according to the requirements of weights and measures legislation.



If the setting 'Tolerance limits as per legislation' has been activated, the tolerance limits may be modified only for the purpose of making them tighter (tolerance limit closer to the target value).

If the setting 'Tolerance limits as per legislation' has not been activated, the tolerance limits can be set as required.

In weighing mode, target values, tare and tolerance limits are also accessible in a separate settings menu, where they can be edited by the user (see Operating Manual).

16.4 Menu structure

├	
├ dCoNFG	
│ ├	
│ ├ STATIS	Statistics
│ │ ├ SUMKEY	Accumulate key for statistics function
│ │ │ └ ACTIVE	Active
│ │ │ ├ No	Statistics function inactive
│ │ │ └ YES	Statistics function active
│ │ ├ AUTOCL	Auto erase statistics memory
│ │ │ ├ YES	Auto erase after final statistical analysis
│ │ │ └ No	No auto erase after final statistical analysis
│ │ ├ SAMPLE	Print each sample
│ │ │ ├ YES	Samples are printed
│ │ │ │ └ _	Custom print ticket for samples (optional specification)
│ │ │ └ No	Samples are not printed
│ │ ├ ENDTKT	Final statistical analysis print ticket
│ │ │ └ _	Custom print ticket for final statistical analysis (optional spec.)
│ │ ├ TARE	Set tare automatically
│ │ │ ├ YES	Product tare set automatically for each sample
│ │ │ └ No	Product tare is not set automatically
│ │ ├ GWMACT	Tolerance limits as per European pre-packaging legislation
│ │ │ ├ YES	Tolerance limits selectable only as per legislation
│ │ │ └ No	Tolerance limits user selectable
│ │ ├ WEIGHT	Target value refers to weight
│ │ │ ├ YES	Target value specified as weight
│ │ │ └ No	Target value specified as quantity
│ │ ├ PRod	Product characteristics
│ │ │ ├ TARGET	Target value (nominal quantity)
│ │ │ ├ TARE	Tare (weight of packaging)
│ │ │ ├ LT1	Tolerance limit LT1
│ │ │ ├ LT2	Tolerance limit LT2
│ │ │ ├ UT1	Tolerance limit UT1
│ │ │ └ UT2	Tolerance limit UT2
│ │ └ RESET	Reset
│ │ ├ No	Do not reset statistics function
│ │ └ YES	Reset statistics function
│ ├	
├	

16.5 Menu table

Menu text	Default	Possible settings
dConFG Device configuration		Enter menu with the ☰ key, select D.Confi and confirm.
****** Password	Manu-factu-rer's num-ber	Enter password and confirm by pressing +0- ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 STATIS Statistics		Select menu item STATIS using the +T- ↓ and ⊙ ↑ keys and confirm.
2 SUMKEY		Use accumulate key for statistics function.
3 ACTIVE	No	Ticker text "Active"
4 YES No		If YES is selected: the statistics function is activated. The accumulate key ⊕ is used for entering an addition in the statistics memory. If No is selected: the statistics function is disabled. The accumulate key ⊕ executes the accumulation function.
2 AUTo.CL Automatic erase		Auto erase statistics memory on output of the final statistical analysis.
3 YES No	YES	If YES is selected: the statistics memory is automatically erased on output of the final statistical analysis. If No is selected: the statistics memory can be erased after a prompt on output of the final statistical analysis.
2 SAMPLE Sample		Print each individual sample.
3 YES - No	YES Not speci-fied	If YES is selected: each sample is printed. If you select "Yes", you can then enter the name of an instruction block to be used as a print ticket for the samples. Enter and confirm the custom print ticket number (instruction block). The instruction block with the specified number must have been created on the indicator. If no name is specified, the standard ticket is printed out. If No is selected: the individual samples are not printed.
2 ENdTKT Final statistical analysis print ticket		Print ticket for the final statistical analysis.
3 -

Menu text	Default	Possible settings
GWMAC German Weights and Measures Act (Packaged Goods)		Tolerance limits in accordance with European pre-packaging legislation.
YES No	YES	If YES is selected: tolerance limits can be set only within the limits permitted by European pre-packaging legislation. If No is selected: tolerance limits are user-selectable.
WEIGHT Weight		Nominal quantity (target value) as a weight value.
YES No	YES	If YES is selected: the nominal quantity is entered as a weight value (in grams). If No is selected: the nominal quantity is entered as a quantity.
PRod. Product		Settings for product characteristics.
TARGET Target value		Target value (nominal quantity)
1000	1000	Target value in grams.
TARE Tare		Tare value (weight of packaging)
0	0	Tare value in grams.
LT1 LT1		Tolerance limit LT1
0	985	Tolerance limit LT1 in grams.
LT2 LT2		Tolerance limit LT2
0	970	Tolerance limit LT2 in grams.
UT1 UT1		Tolerance limit UT1
0	1015	Tolerance limit UT1in grams.
UT2 UT2		Tolerance limit UT2
0	1030	Tolerance limit UT2 in grams.
RESET Reset		Reset statistics function.
YES No	YES	If YES is selected: reset is performed. The statistics memory is erased and the following parameters are set to default values: target value, tare, LT1, LT2, UT1 and UT2. If No is selected: reset is not performed.

16.6 Required weighing instrument characteristics

Checks of prepackages must be carried out regularly in accordance with recognised statistical quality assurance procedures. The provisions to be complied with are laid down in the relevant weights and measures regulations for packaged goods.

The weighing instruments used must be verified as checkweighers and marked accordingly.

16.6.1 Nominal quantities to 10 kg

Random checks are to be performed for prepackages with nominal quantities to 10 kg.
The verification scale interval of the non-automatic checkweighers used may not be greater than:

Nominal quantity QN of the prepackages in g or ml	Maximum verification scale interval in g
Less than 10	0.1
From 10 to less than 50	0.2
From 50 to less than 150	0.5
From 150 to less than 500	1.0
From 500 to less than 2500	2.0
2500 and more	5.0

16.6.2 Nominal quantities above 10 kg

A 100% check is to be performed for prepackages with nominal quantities above 10 kg.
The verification scale interval of the non-automatic checkweighers used may not be greater than:

Nominal quantity QN of the prepackages in kg or l	Maximum verification scale interval in g
More than 10 to less than 15	10
15 to less than 25	20
25 to less than 100	50

17.1 Overview

The indicator has two interfaces that are operated as serial interfaces (RS232) as standard. Interface 1 can also be connected as a TTY interface. See Chapter 4.5.2 “TTY at interface 1“ on page 20.

Additional optional plug-in cards permit Ethernet or Profibus connectability via interface 1. Data can thus be exchanged with a variety of terminals and systems.

17.2 Menu structure

The interfaces are configured on the menu level INFACE in the device configuration menu.

├	
├ dEvNFG	Device configuration
│ ├ INFACE	Interfaces
│ │ ├ INTER.1	Interface 1
│ │ │ ├ BAUdRA	Select baud rate
│ │ │ │ ├ 600	600 baud
│ │ │ │ ├ 1200	1200 baud
│ │ │ │ ├ 2400	2400 baud
│ │ │ │ ├ 4800	4800 baud
│ │ │ │ ├ 9600	9600 baud
│ │ │ │ ├ 19200	19200 baud
│ │ │ │ └ 38400	38400 baud
│ │ │ ├ dATLEN	Data length (number of data bits)
│ │ │ │ ├ LGTH=7	Length = 7 data bits
│ │ │ │ └ LGTH=8	Length = 8 data bits
│ │ │ ├ PARITY	Parity (parity bit)
│ │ │ │ ├ EVEN	Even
│ │ │ │ ├ odd	Odd
│ │ │ │ └ NoNE	None
│ │ │ ├ StoPBI	Stop bits
│ │ │ │ ├ StoP.1	1 stop bit
│ │ │ │ └ StoP.2	2 Stop bits
│ │ │ ├ HANdSH	Handshake (flow control)
│ │ │ │ ├ HARd	Hardware
│ │ │ │ ├ NoHANd	None
│ │ │ │ └ SoFT	Software

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VERINT	Verifiable interface
YES	Yes (interface is verifiable)
No	No (interface is not verifiable)
CoMTYP	Interface type
RS 232	RS 232
TTY	TTY
NETWRK	Network (Ethernet or Profibus, via option board only)
INFREd	Infrared (still without function, prepared for future option)
INTER2	Interface 2
....	(settings as for interface 1, but without CoM-TYP)
....	
....	

17.3 Menu table

Parameters must be entered separately for each interface.

Menu text	Default	Explanation
dCoNFG Device configuration		Enter menu with the ☰ key. Select dCoNFG using the ↓ and ↑ keys and confirm.
****** Password	Manu-factu-rer's num-ber	Enter password and confirm by pressing ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 INFACE Interface		Select INFACE menu item using the ↓ and ↑ keys and confirm.
2 INTER.1 Interface 1		Select interface to be set (1 or 2) using the ↓ and ↑ keys and confirm.
3 BAUdRA Baud rate		Sets the baud rate.
4 9600	9600	Select baud rate and confirm. Possible values: 600, 1200, 2400, 4800, 9600, 19200, 38400 baud.
3 dATLEN Data length		Sets the data length (data bits).
4 LGTH=8 Length = 8	8	Select data length and confirm. Possible values: 7 or 8 data bits.
3 PARITY Parity		Sets the parity (parity bits).
4 NoNE None	NoNE	Select parity scheme and confirm. Possible values: even, odd, none.
3 StoPBI Stop bits		Sets the stop bits.

Menu text	Default	Explanation
4 STOP.1 Stop bits 1	1	Select number of stop bits and confirm. Possible values: 1 or 2 .
3 HANDSH Handshake		Sets the handshake (flow control).
4 HARd Hardware	HARd	Select handshake and confirm. Possible values: Hardware, none, software.
3 VER.INT Verifiable		Sets the verifiability.
4 No No	No	Select characteristic and confirm (parameter can be changed only if no verification seal has been attached). If No is selected: The interface has no verification seal protection. Existing instruction blocks are not checked and not sealed on closure of the verification seal. If YES is selected: The interface has verification seal protection. Existing instruction blocks are output for checking and then sealed on closure of the verification seal. Changes to instruction blocks are therefore restricted. See Chapter 22.4 "Sealed instruction blocks" on page 92 for details.
3 COM.TYP Com.Typ (interface type)		Sets the interface type (interface 1 only).
4 RS 232 RS 232	RS 232	Communications from interface 1 can be forwarded to other ports, depending on the connection type or optional plug-in card. RS 232 = RS 232 (standard connection serial interface) TTY = TTY (connection as TTY interface) NETWRK = Network card (Ethernet or Profibus option board) INFRED = Infrared (still without function, prepared for future options) **Info:** The service connector can be used only if RS 232 has been selected as the interface type.
3 BAUdRA Baud rate		Once the setting for the final menu item has been entered, the first menu item is displayed again.
0.000		Exit menu with the ⌨ key. Indication of the weight.

Interface 2 cannot be forwarded to other ports. It is used solely as a serial RS 232 interface. The menu item COM.TYP is therefore not displayed in the settings menu for interface 2.

18.1 Overview

- The indicator allows the user to create standard outputs for different printer types or indicators. Various formats are available for selection.
- Each interface can be assigned its own output format.
- The selected standard print ticket is output if the ◎ key is pressed.
- The individual formats for these standard print tickets are tailored to the specified printer types or indicators and cannot be changed.
- Headers and footers can be added to standard print tickets, however.
  See Chapter 20 “Headers and footers“ on page 85.
- Application-specific instruction blocks can also be created for special output formats or weighing procedures. See Chapter 22 “Instruction blocks“ on page 91.

18.2 Menu structure

The indicator is configured on the menu level PRINT in the device configuration menu.

├	
├ dCoNFG	
│ ├ PRINT	Print
│ │ ├ TKTSET	Print settings
│ │ │ ├ INTER.1	Interface 1
│ │ │ │ ├ FoRMAT	Format (output format or printer type)
│ │ │ │ │ ├ 80-A	Forms printer with 80 characters/line
│ │ │ │ │ ├ 40-A	Roll printer with 40 characters/line
│ │ │ │ │ ├ 32-A	Roll printer with 32 characters/line
│ │ │ │ │ ├ 24-A	Roll printer with 24 characters/line
│ │ │ │ │ ├ UNIVER	Universal printer (settings via configuration software)
│ │ │ │ │ └ dISPL.1	Large or remote display (permanent data output)
│ │ │ │ ├ NUMBER	Number
│ │ │ │ └ NUM 1	Number 1 (number of outputs per keypress)
│ │ │ └ INTERV	Queue time (only if number set to greater than 1)
│ │ │ └ 0	Queue time between two outputs (in seconds)
│ │ │ └ REFQTY	Reference quantity
│ │ │ └ No	No/Yes (also print reference quantity)
│ │ │ └ INTER2	Interface 2
│ │ │ ├	Setting options as for interface 1
│ │ ├ SERNR	Serial number
│ │ │ └ 123	Set number
│ │ └ PoINT	Point as decimal separator
│ │ └ YES	Yes/No (Yes = point / No = comma)
│ └	

18.3 Menu table

18.3.1 Setting the standard print ticket

The standard print ticket can be set separately for each interface. Some examples of print tickets are described in Chapter 19 “Default output formats“ on page 75.

Menu text	Default	Possible settings
dConFG Device configuration		Enter menu with the ☰. Select dConFG using the +T0 ↓ and ◎ ↑ keys and confirm.
****** Password	Manu-factu-rer's num-ber	Enter password and confirm by pressing 0 ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 PRINT Print		Select menu item PRINT using the +T0 ↓ and ◎ ↑ keys and confirm.
2 TKT.SET Print settings		Selection of print settings.
3 INTER.1 Interface 1		Select the interface for which the settings are to be made using the +T0 ↓ and ◎ ↑ keys and confirm.
4 FoRMAT Format		Standard print ticket format.
4 80-A 80-A	32-A	Select the standard print ticket for the specified device type. The following settings are possible: 80-A = 80-A = Forms printer with 80 characters/line 40-A = 40-A = Roll printer with 40 characters/line 32-A = 32-A = Roll printer with 32 characters/line 24-A = 24-A = Roll printer with 24 characters/line UNIVER = Univer = universal printer (configurable) dISPL.1 = Displ.1 = Large or remote display See Chapter 19 “Default output formats“ on page 75 for format details.
4 NUMBER Number		Number of print tickets (number of outputs per keypress).
5 NUM 1 Number	0	Select number of print tickets to be output. 0 = None 1 = One 2 to 10 = Output is repeated the specified number of times.
5 INTERV Interval		Sets the queue time. Menu item appears only if the number of tickets is set to greater than 1.
6 WAITING TIME Waiting time 10	0	Ticker text "Waiting time" Enter queue time of between 0 and 64 seconds.
4 REF.QTY Reference quantity		Setting determining whether the reference quantity should be included in the printout.
5 PRINT REFERENCE QUANTITY YES No	YES	Ticker text "Print reference quantity" YES = Reference quantity is printed No = Reference quantity is not printed.
0.000		Exit menu with the ☰ key. Indication of the weight.

18.3.2 Serial number

Each print ticket is furnished with a serial number. The number specified is used for the next printout and then increased by 1.

If the alibi memory is used, the serial number cannot be changed to a lower value. Otherwise the memory would contain a duplicate ticket number.

Menu text	Default	Possible settings
dCoNFG Device configuration		Enter menu with the ☰ key. Select dCoNFG using the →T← ↓ and ◎ ↑ keys and confirm.
****** Password	Manu-facturer's number	Enter password and confirm by pressing →0← ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 PRINT Print		Select menu item PRINT and confirm.
2 SERNo Serial number		Select menu item SERNo using the →T← ↓ and ◎ ↑ keys and confirm.
3 123 123		Enter new number and confirm with →0← ↵.
0.000		Exit menu with the ☰ key. Indication of the weight.

18.3.3 Decimal separator

A comma or a point can be selected as the decimal separator to be output on the print ticket.

The decimal separator selected is also taken into account when outputting values transmitted on the basis of instructions in the instruction blocks. The character set here is used for the decimal separator for these values.

Menu text	Default	Possible settings
dCoNFG Device configuration		Enter menu with the ☰ key. Select dCoNFG using the →T← ↓ and ◎ ↑ keys and confirm.
****** Password	Manu-facturer's number	Enter password and confirm by pressing →0← ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 PRINT Print		Select menu item PRINT and confirm.
2 PoINT Point		Select menu item PoINT using the →T← ↓ and ◎ ↑ keys and confirm.
3 YES No	YES	If YES is selected, a point is used as the decimal separator, if No is selected, a comma.
0.000		Exit menu with the ☰ key. Indication of the weight.

19.1 Overview

- Default output formats are stored on the indicator and can be used whenever custom output formats are not required.
- The output format is set in the DEVICE CONFIGURATION| PRINT menu.

19.2 Format 80-A (80 characters/line)

Output format for forms printers with 80 characters per line. This output format can be used for printing logs in list form.

Printer properties	Format description
Printout on continuous stationery or single-sheet automatic feed	Individual values are output next to each other, 24 characters per value, 3 values per row.
Print width: 80 characters standard type	No highlighting of individual values. Blank line on printout, no paper advance.

As this default format does not use any printer-specific control commands, it should be possible to print the ticket on any commercially available forms printer.

Initialisation of the printer is to be performed via the header. The form feed can be controlled via the footer.

Example of a print ticket:

```
Number               248    16.01.2007         13:54    Gross           49.7 kg

Tare               9.6 kg    Net            40.1 kg
--------------------------------------------------------------------------------

Number               249    16.01.2007         14:04    Gross           33.9 kg

Tare              11.2 kg    Net            22.7 kg
--------------------------------------------------------------------------------
```

19.3 Format 40-A (40 characters/line)

Output format for roll printers with 40 characters per line.

Printer properties	Format description
Thermal receipt printer	Individual values are printed out underneath each other.
Receipt width: 40 characters standard type 80 characters narrow type	Highlighting by bold print. Broken line and paper feed on printout.

The print control commands correspond to EPSON ESC/P commands. Any printer compatible with these commands can be used.

Example of a print ticket:

```
No.         249       16.01.2007      14:04
Gross                                33.7 kg
Tare                                 11.2 kg

Net                                  22.5 kg
----------------------------------------
```

19.4 Format 32-A (32 characters/line)

Output format for roll printers with 32 characters per line.

Printer properties	Format description
Thermal receipt printer	Individual values are printed out underneath each other.
Receipt width: 32 characters standard type	Highlighting by double-height characters. Broken line and paper feed on printout.

Example of a print ticket:

```
No.         249  16.01.2007 14:04
Gross                    33.7 kg
Tare                     11.2 kg
Net                      22.5 kg
--------------------------------
```

19.5 Format 24-A (24 characters/line)

Output format for roll printers with 24 characters per line.

Printer properties	Format description
Dot matrix receipt printer	Individual values are printed out underneath each other.
Receipt width: 24 characters standard type	No highlighting of individual values. Broken line and paper feed on printout

Example of a print ticket:

```
Number                 249
16.01.2007           14:04
Gross              33.7 kg
Tare               11.2 kg
Net                22.5 kg
- - - - - - - - - - - - -
```

19.6 Format UNIVER. (universal)

Output format for connecting a random line printer with code page 437 character set (Epson compatible). The settings for formatting the print ticket can be adjusted to the printer or the paper format used.

Select the format type UNIVER. (universal) in the device configuration menu. The associated format settings (print width, print length, highlighting ON/OFF) must be made on the PC using the configuration software.

Print width

The print width specifies the output width in characters (characters per line). The printout is formatted automatically so as to use the entire print width.

The designation for the values is left-justified, the values and associated unit right-justified. The gap in between is filled with spaces.

The following print width values must be observed:

Minimum print width: 23 characters
Default print width: 40 characters
Maximum print width: 255 characters

The ticket number and date/time are printed underneath each other on two lines if the print width is between 23 and 30 characters or next to each other on one line if over 31 characters.

Print length

The minimum length of the printout is specified via the print length. This ensures that the receipt is long enough to tear off and affix.

The print length is also used to create printouts of the same length even when the number of data lines differs. This is necessary, for example, when printing onto labels created on continuous strips without a special label printer.

The print length specifies the minimum number of lines to be printed. If, on printout of all the data, the requisite number of lines has yet to be reached, blank lines are appended using CR LF = \013\010. If the number of data lines is greater than the print length, the data is printed out regardless.

The print length can also be entered as a negative value. In this case lines are appended only if the number of printed data lines is smaller than the print length (see also following table).

Print length	Number of lines printed is smaller than the print length	Number of lines printed is greater than the print length
Positive number 10	The remaining lines are appended as blank lines	Blank lines are appended until the next multiple of the print length. This ensures compliance with the print length pattern (e.g. for labels).
Example:	Print length: 10 Lines printed: 7 Lines appended: 3	Print length: 10 Lines printed: 14 Lines appended: 6
Negative number - 10	The remaining lines are appended as blank lines	All lines of data are output, no blank lines are appended.
Example:	Print length: 10 Lines printed: 7 Lines appended: 3	Print length: 10 Lines printed: 14 Lines appended: 0

Each row of data counts as a line. Multi-line headers and footers as well as variables are taken into account when counting the lines. The line count is calculated from the number of occurrences of the control character string CR LF = \013\010.

The following print length values must be observed:
Minimum print length: -127 lines
Default print length: 18 lines
Maximum print length: 127 lines

Highlighting On

Depending on the active weighing functions, some weighing results (e.g. gross or net) are highlighted on standard print tickets. The areas of the printout that are highlighted on the standard print ticket are permanently set and cannot be changed. Only the type of highlighting can be changed. Characters can, for example, be printed in double height or bold type.

The control codes for activating highlighting can be found in the printer manual.

If no highlighting is required, no entry needs to be made here.

Highlighting Off

The control codes for deactivating highlighting are entered here. They can be found in the printer manual.

If no highlighting is required, no entry needs to be made here.

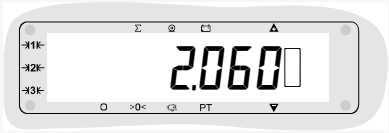
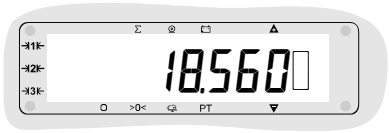
19.7 Format dISPL. 1 (large or remote displays)

The indication, i.e. the content thereof, is continuously output to a large display or another indicator being used as a remote display. A data record is output each time the indication is updated.

Structure of the data record

The data record consists of 22 bytes and is structured as follows:

Byte no.	No. of bytes	Value	Description
1	1	Start of text	STX dec002 0x02
2-12	11	Indication	Content of the indication, left-justified. When the value on the display switches, the value transmitted also changes. In other words, the value displayed is not always a weight value. The indicator display has 6 places and a decimal separator. Text shown on the display such as 'UNLoAd' is not output. Empty fields on the display are transmitted as blank spaces. The decimal separator is transmitted as a point (dec46 0x2E). Blank spaces are used to fill up the 11 places.
13	1	Range, stable indication	Current weighing range 0x23 Range 3, indication stable 0x25 Range 2, indication stable 0x26 Range 1, indication stable 0x27 Indication unstable
14	1	Unit	Current unit 0x28 Quantity 0xA0 Weight in kg 0xA8 Weight in g
15	1	Total	Total present? 0 No total present 1 At least 1 addition has been made
16	1	Count	Count status 0 Count function inactive 1 Count function active. When the count function is active, either the quantity is transmitted or the weight. The value transmitted can be identified by the unit.
17	1	Zero	Indication at zero? 0 Indication not at zero. 1 Indication at zero, the deviation from exact zero is less than 0.25d.
18	1	Tare	Tare set? 0 No tare set 1 A tare (T1, T2 or PT) has been set
19	1	Flashing	Flashing rhythm of main display 0 No flashing
20-21	2	Line feed	CR dec013 0x0D LF dec010 0x0A
22	1	End of text	EOT dec004 0x04

Indication	Data record	Comments
	STX ..0.000.... 0x26 0xA0 0 0 1 0 0 CR LF EOT	Range 1, indication stable, weight in kg, indication at zero
	STX ..2.060.... 0x27 0xA0 0 0 0 0 0 CR LF EOT	Indication unstable, weight in kg
	STX ..18.560... 0x25 0xA0 0 0 0 1 0 CR LF EOT	Range 2, indication stable, weight in kg, tare set

19.8 Format EdP 1 (connection to IT)

On pressing a key a data record with the current weighing results is output. (The data record can also be output by "**automatic output**" or by sending the instruction **<FP>** via the serial interface.)

Ten values are transmitted:

Serial no. ; date ; time ; weighing platform no. ; weighing range ; quantity ; unit of weight ; gross ; tare ; net

The individual values are separated by a semicolon in the data record. Starting and terminating characters are the ASCII characters STX (0x02) and ETX (0x03). CR LF (0x13 0x10) is output at the end of the data record.

The complete data record is 79 characters long.

If a header (for "standard printout") has been created, this character string precedes the data record.

If a footer (for "standard printout") has been created, the end of data record (CR LF) is replaced by the footer.

If the alibi memory has been set up on the indicator, an entry is stored in the memory automatically each time a data record is issued.

Example data record in format EdP 1

```
0 0000000011111111112222222222333333333344444444455555555556666666666777777 7 7 7
1 2345678901234567890123456789012345678901234567890123456789012345678901234567 8 9
S ;     15734;07.02.2007;09:35:43;1;1;       0;kg;   2.850;   1.300;   1.550; E C L
T                                                                             T R F
X                                                                             X

       Ser.no;     Date; Time;W;B;   Nos.;Unit;  Gross;    Tare;   Net
```

If the device does not have a clock, the date and time are replaced by a corresponding number of spaces.

Byte	Value	Format
		Preceding header (only if created)
1	STX	1 digit, ASCII value 2 (START OF TEXT)
2	;	1 digit, delimiter = semicolon ";"
3 - 12	Serial number	10 digits, numeric, right justified, with leading spaces
13	;	1 digit, delimiter = semicolon ";"
14 - 23	Date	10 digits, format DD.MM.YYYY (e.g. 07.02.2007) (If the device has no clock, 10 spaces are output.)
24	;	1 digit, delimiter = semicolon ";"
25 - 32	Time	8 digits, format HH:MM:SS (e.g. 09:35:43) (If the device has no clock, 8 spaces are output.)
33	;	1 digit, delimiter = semicolon ";"
34	Weighing platform no.	1 digit, (always 1)
35	;	1 digit, delimiter = semicolon ";"
36	Weighing range	1 digit, (1, 2 or 3)
37	;	1 digit, delimiter = semicolon ";"
38 - 45	Quantity	8 digits, numeric, right justified, with leading spaces (only if count function is present and active, otherwise value = 0)
46	;	1 digit, delimiter = semicolon ";"
47 - 48	Unit of weight	2 digits, alphanumeric, left justified, with leading spaces Unit of weight for the values gross, tare and net (kg or g)
49	;	1 digit, delimiter = semicolon ";"
50 - 57	Gross	8 digits, numeric, right justified, with leading spaces Gross weight value
58	;	1 digit, delimiter = semicolon ";"
59 - 66	Tare	8 digits, numeric, right justified, with leading spaces Total tare weight value = sum of tare and preset tare
67	;	1 digit, delimiter = semicolon ";"
68 - 75	Net	8 digits, numeric, right justified, with leading spaces Net weight value
76	;	1 digit, delimiter = semicolon ";"
77	ETX	1 digit, ASCII value 3 (END OF TEXT)
78	CR	1 digit, ASCII value 13 (CARRIAGE RETURN)
79	LF	1 digit, ASCII value 10 (LINE FEED)
		Or footer from byte 78 (only if created)

19.9 Format EdP 2 (connection to IT)

On pressing a key a data record with the current weighing results is output. (The data record can also be output by "**automatic output**" or by sending the instruction **<FP>** via the serial interface.)

Eight values are transmitted:

Stable condition status ; weighing platform no. ; weighing range ; quantity ;
unit of weight ; gross ; tare ; net

The individual values are separated by a semicolon in the data record. Starting and terminating characters are the ASCII characters STX (0x02) and ETX (0x03). CR LF (0x13 0x10) is output at the end of the data record.

The complete data record is 50 characters long.

If a header (for "standard printout") has been created, this character string precedes the data record.

If a footer (for "standard printout") has been created, the end of data record (CR LF) is replaced by the footer.

No entry is created in the alibi memory for this data record.

Example data record in format EdP 2

```
0 00000000111111111122222222223333333333444444444 4 4 5
1 23456789012345678901234567890123456789012345678 9 9 0
S ;1;1;1;       0;kg;   2.850;   1.300;   1.550; E C L
T                                                T R F
X                                                X

   R;W;B;   Nos.;Unit;  Gross;    Tare;   Net
```

Byte	Value	Format
		Preceding header (only if created)
1	STX	1 digit, ASCII value 2 (START OF TEXT)
2	;	1 digit, delimiter = semicolon ";"
3	Stable condition status	1 digit, numeric (1 = stable indication, 0 = unstable)
4	;	1 digit, delimiter = semicolon ";"
5	Weighing platform no.	1 digit, (always 1)
6	;	1 digit, delimiter = semicolon ";"
7	Weighing range	1 digit, (1, 2 or 3)
8	;	1 digit, delimiter = semicolon ";"
9 - 16	Quantity	8 digits, numeric, right justified, with leading spaces (only if count function is present and active, otherwise value = 0)
17	;	1 digit, delimiter = semicolon ";"
18 - 19	Unit of weight	2 digits, alphanumeric, left justified, with leading spaces Unit of weight for the values gross, tare and net (kg or g)
20	;	1 digit, delimiter = semicolon ";"
21 - 28	Gross	8 digits, numeric, right justified, with leading spaces Gross weight value
29	;	1 digit, delimiter = semicolon ";"
30 - 37	Tare	8 digits, numeric, right justified, with leading spaces Total tare weight value = sum of tare and preset tare
38	;	1 digit, delimiter = semicolon ";"
39 - 46	Net	8 digits, numeric, right justified, with leading spaces Net weight value
47	;	1 digit, delimiter = semicolon ";"
48	ETX	1 digit, ASCII value 3 (END OF TEXT)
49	CR	1 digit, ASCII value 13 (CARRIAGE RETURN)
50	LF	1 digit, ASCII value 10 (LINE FEED)
		Or footer from byte 49 (only if created)

20.1 Overview

- Custom headers and footers can be added to the indicator's standard print tickets.
- Headers and footers can be created separately for the various standard print tickets.
- Headers are placed in front of the selected standard print ticket.
- Footers are appended to the selected standard print ticket.
- Headers and footers are not taken into account when executing instruction blocks or outputting the data records dISPLY 1 (for large or remote displays) and EdP 1 (for IT connections).
- Headers and footers can be created and edited only on a PC using the configuration software.

20.2 Applications

Headers and footers can be used if the available standard print tickets are sufficient and only require the addition of a few extra details.

20.3 Characteristics

20.3.1 Headers

Text string:

A maximum of 250 characters can be entered as a header. Apart from 'standard' characters such as letters and numbers, extended characters for controlling printers (such as CR LF or ESC) may also be used. Characters in headers appear on the print ticket as entered.

Instruction block:

Instead of text, the name of an instruction block to be performed on the indicator before the print ticket is output can be specified.

20.3.2 Footers

The default footer comprises the broken line at the bottom of the ticket and the paper feed or eject characters. If no footer is defined, the default footer is printed.

User-defined footers do not include the broken line or paper feed command. Instead, the text entered as the footer is printed. If you wish to retain the broken line and paper feed function, you must include the necessary characters in the footer.

Text string:

A maximum of 250 characters can be entered as a footer. Apart from 'standard' characters such as letters and numbers, extended characters for controlling printers (such as CR LF or ESC) may also be used. Characters in the footer appear on the print ticket as entered.

Instruction block:

Instead of text, the name of an instruction block to be performed on the indicator on output of the print ticket can be specified.

20.4 Examples

20.4.1 Header as text string

A header is to be added to the standard print ticket at interface 1 for the CBM 270 printer type with a print width of 32 characters per line. The header is to include the name and location of a branch.

The following character string is entered as the header:
`\027!\024MF Branch\027!\000\013\01040822 Mansfield\013\010\013\010`

The printer control characters are integrated in the header and highlighted in the above example. The following control characters were used in this example:
`\027!\024` = Change of font
`\027!\000` = Return to default font
`\013\010` = Line break

The printout appears as follows:

```
MF Branch
Main Street, Mansfield

No.          25   03.01.2007 14:42
Gross                    37,480 kg
Tare                      9,060 kg
Net                     28,420 kg
--------------------------------
```

Three-line header
(2 lines of text + 1 blank line)

Standard print ticket

20.4.2 Headers and footers as instruction blocks

The task described in the example given at 20.4.1 “Header as text string“ can also be solved using an instruction block. In this case, the output of text and control characters is evoked by corresponding instructions.

An instruction block containing the following instructions is created:
`<EA1\027!\024><EA1MF Branch><EA1\027!\000\013\010><EA140822 Mansfield>`
`<EA1\013\010\013\010>`

Next, the name of the instruction block is specified in the configuration software for the header of the standard print ticket.

If an instruction block is used for the header or footer, instructions for controlling weighing instrument functions can be included in addition to the instructions for outputting data.

A "Delete tare" instruction can be included in the instruction block for a footer, for example. The tare value is then deleted automatically on printout.

21.1 Overview

- Variables are memory cells that are available for a number of functions. They can contain values used to add to a data output or as parameters for functions.
- We distinguish between the definition and the content of a variable.
- The definition of a variable describes the properties of the memory cell itself. Settings can be entered for supplementary text to be displayed or printed out, the input source, permissible input values, and the minimum and maximum length. These definitions can subsequently be amended at any time.
- The content of the variable is the value in the memory cell. The user is prompted to enter a value that is stored as the content of the variable on confirmation of the entry.
- When entering a value in a variable via the keypad, only numbers and the decimal point are available.
- When entering a value in a variable via the serial interface (e.g. using a barcode reader), alphanumeric entries are possible (letters and numbers).
- The content of the variable is retained until it is overwritten by a new value or the device is switched off. On power up, the content of all variables is replaced with the values specified as the default parameters.
- Ten variables can be created on the indicator.
- If required, the variables created can also be included in the standard print tickets permanently stored on the indicator. When printing a standard print ticket, the relevant variable is thus automatically prompted and printed.

- Variables can be created and edited only on a PC using the configuration software.

21.2 Applications

Variables can be used to add information to a print ticket or a data record sent to a computer that renders the weighing operation uniquely identifiable or permits an assignment to a specific category (e.g. customer, product, order or traceability numbers, employee ID numbers, scanned barcodes).

Variables can also contain values used as function parameters.

21.3 Characteristics

21.3.1 Number of variables

A maximum of ten variables can be created on the indicator.

21.3.2 Name on display

The name of the variable is briefly displayed as an entry prompt when the variable is prompted. It can be a maximum of six characters long.

21.3.3 Text on printout

Text to be inserted on the printout when the variable is output. It can be a maximum of 159 characters long. Letters and numbers can be entered as text as well as printer control characters (e.g. for position control).

21.3.4 Text after printout

Text to be output after the variable is printed. It can be a maximum of 159 characters long. Letters and numbers can be entered as text as well as printer control characters (e.g. for position control).

21.3.5 Auto prompt

When this function is active, the variable is prompted automatically (entry prompt) when a standard print ticket is output.

21.3.6 Auto printout

When this function is active, the variable is printed automatically when a standard print ticket is output.

21.3.7 Display time (all variables)

When a variable is prompted, its name (NAME ON DISPLAY) appears briefly on the display. The display time can be set in milliseconds.
Maximum display time = 9000 milliseconds
Default display time = 1500 milliseconds.

21.3.8 Input source

The input source indicates whether the value in the variable can be entered via the keypad and also set via the serial interface (e.g. by a barcode reader).

Examples

Set input source	Explanation	Action on entry
Keypad	Input via the indicator keypad.	The entry prompt appears on the display and an input via the keypad is expected.
Keypad and Com1	Input via the indicator keypad or interface 1.	The entry prompt appears on the display and input via the keypad or the interface is accepted.
Com1	Input via serial interface 1.	The entry prompt appears on the display, but data is accepted from the interface only.
No input	No entry prompt appears on the display.	The variable value can be selected via the menu only. The value entered remains available until changed.

21.3.9 Input end type

The input end type must be set for entries made via the serial interface. This determines how the indicator detects the end of an entry made via the interface. If entries are made solely via the keypad, the parameter 'input end type' cannot be set.

End after	Explanation
Max. length	The data is applied as a value in the variable on receipt of a specific number of characters. The number of characters is set in the 'Maximum length' parameter. See Chapter 21.3.12 “Maximum length“ on page 89.
Terminating character	The data is applied as a value in the variable on receipt of a terminating character. The terminating character selected is not entered in the variable, but it has to be transmitted to terminate each data entry. A maximum of two characters are permitted as terminating characters. Control characters such as ETX = \003 or CR LF = \013\010 can also be entered as terminating characters.

21.3.10 Preset type

Preset value to be proposed when variables are prompted. A preset value can be applied, edited or overwritten.

Preset type	Explanation
No preset	No value is proposed, the entry field is empty.
Default	The default value is always proposed. See Chapter 21.3.14 “Default value“ on page 90.
Previous value	The value last entered is proposed. The default value is proposed the first time the variable is prompted after the indicator has been switched on.

21.3.11 Minimum length

Minimum number of characters to be accepted as a valid entry. The value entered when the variable is prompted must be of at least the length specified here. Shorter values will not be accepted and have to be re-entered.

The minimum length can be set between 0 and 30 characters. If the minimum length is 0 characters, a blank value (0 characters) can also be entered. The minimum length selected may not exceed the maximum length.

21.3.12 Maximum length

Maximum number of characters possible during an entry. The value in the variable may not exceed the length specified here. Longer variables cannot be entered.

The maximum length can be set between 1 and 30 characters. The maximum length selected may not be smaller than the minimum length.

21.3.13 Output format

The output format specifies how the value in the variable is to be output. The following settings are available:

- The number of places to be output (between 0 and 999)
- Right- or left-justified output of the value in the number of places to be output.

– If the value is shorter than the number of places to be output, the missing characters are output as spaces before or after the value.
– If the value is longer than the number of places to be output, it is not truncated, but rather output in full with all additional characters.
– If output without any formatting, the value is output from the current position. Subsequent data is output directly after the last character of the value. The position of subsequent data varies according to the length of the value.

The output format is entered as follows:

Output format	Explanation
Positive number (e.g. 20)	Right-justified output in the specified width (i.e. 20 characters).
Negative number (e.g. -20)	Left-justified output in the specified width (i.e. 20 characters).

Examples:

In these examples the interpunct "·" is used for the visual representation of spaces. Decimal points in the value are counted as characters to be output.

Text on printout	Value in variable	Text after printout	Output format	Output
Product:	1234.5		12	Product:····**1234.5**
Customer:	75942		-12	Customer:**75942**·····
Quantity:	253725		4	Quantity:**253725**
Quantity:	3000	units	-5	Quantity:**3000**·units
Quantity:	20	units	-5	Quantity:**20**···units
Quantity:	3000	·units	5	Quantity:·**3000**·units
Quantity:	20	·units	5	Quantity:···**20**·units

21.3.14 Default value

Value to be proposed when variables are prompted, if default has been set as the preset type. On indicator power up the specified default value is set as the content of the variable.

The default value is also used when 'No input' is selected as the input source. The value entered here remains available in the memory even when the indicator has been switched off.

The default value is specified on creation of the variable. The default value can be changed via the menu during subsequent use (see Operating Manual).

21.3.15 Entry overwrites default

When this function is active, the default value is overwritten when a new value is entered in a variable. The default value thus changes with each new entry. On device power off the last entry is thus retained as the default value. On device power up the default value is again set as the content of the variable.

22.1 Overview

- Instruction blocks consist of a chain of instructions that can be put together with different functions according to the application.
- The choice and order of the instructions determines the sequence of operations performed by the instruction block.
- Ten instruction blocks can be stored on the indicator.
- Instruction blocks can be created and edited only on a PC using the configuration software.

22.2 Applications

Instruction blocks can be used to create custom tasks on a printer or transmit a special data format to a computer. Operating sequences can also be created to permit user interaction or to put the device into specific operating modes.

22.3 Characteristics

22.3.1 Instruction block name

Each instruction block is given a name comprising a number up to six digits long. The name is user selectable.

22.3.2 Reserved instruction blocks

Some names, however, have been reserved for certain indicator functions. If the function is to be used, the instruction block must be created with the name reserved for it on the device. If the function is not required, no instruction block is created.

Attention!

Reserved names may not be used for other applications.

Name	Function
	Responses from the data logger
920010	Data record received
920020	Error in data record
920030	Data memory full
	Response from DataLog
920110	Data sent successfully
920120	Data not sent successfully
920130	Prompt unsuccessful or Delete not successful
	Autostart
930001	This instruction block is executed once on indicator power up.

22.3.3 Instruction block content

The indicator has a host of functions that can be invoked by instructions. The relevant instructions must be arranged in an instruction block according to the operations required and are then processed in the stipulated sequence when the instruction block is executed.

The instructions and their properties are described in a separate user manual.

An instruction block can have a maximum of 1800 characters.

22.3.4 Execution of instruction blocks

In the default configuration the print key is used to issue a standard print ticket. If an instruction block is to be executed, the function of the print key has to be changed and the name of the instruction block specified. These configuration properties can be set only on a PC using the configuration software.

22.4 Sealed instruction blocks

If verification seal protection is activated for an interface, the instruction blocks are output for chekking on closure of the verification seal and then sealed.

The verification seal protection function checks the following instruction block properties:

Verification seal	Interface	Instruction block	Restrictions
Attached	With verification seal protection	Sealed	Instructions for the output of data at an interface with verification seal protection can be changed only in a limited way.
Attached	With verification seal protection	Not sealed	Instructions for the output of data at an interface with verification seal protection are not executed.

- Instructions in a sealed instruction block that initiate the output of data at an interface with verification seal protection can be changed only in a limited way if the verification seal is closed. A sealed instruction block can also contain instructions that initiate the output of data at an interface without verification seal protection. These instructions can be changed without restriction.
- If the verification seal is closed, instructions initiating the output of data at an interface with verification seal protection are executed only if the instruction block has been sealed.
- On destruction of the verification seal, the instruction blocks are unsealed. Changes can then be made to the instructions without restriction.
- On closure of the verification seal, all instruction blocks initiating the output of data at an interface with verification seal protection are output once for checking. The checker can satisfy himself that the output values are correct before sealing the instruction blocks. This prevents unauthorised changes being made to the instruction blocks.

22.5 Examples

For reasons of clarity the instructions are arranged underneath each other in the examples. In the configuration software on the PC the instructions are represented as a continuous chain.

Character \010: The three-digit numbers with preceding backslash are control characters for forcing a line break in the printout or changing the printer font. They are used for ASCII characters outside the normal character range for letters and numbers. The two control characters \013\010 force a line break, for example. Some control characters may vary depending on the printer type.

Spaces are represented by an interpunct " · " in this documentation.

22.5.1 Printout with gross, tare and net

Printout is effected at interface 1 on a printer of the type CBM 270 with a print width of 32 characters per line.

Instruction	Remarks
<FA1>	(Additional function, if required) Freeze weight values and wait for stable indication.
<GP11No.%11lu··><GD1><GE1%6s\013\010>	**1st line** : Ser.no., date and time
<GB1Gross%23.3f·kg\013\010>	**2nd line**: Gross
<GS1Tare%25.3f·kg\013\010>	**3rd line**: Tare
<EA1\027!\024>	Change font on printer
<GN1Net%24.3f·kg\013\010>	**4th line**: Net
<EA1\027!\000>	Return to default font
<EB132->	**5th line**: Broken line
<EB108\013\010>	8 blank lines (paper feed)
<Fa>	(Additional function, if required) Enable weight values.

Print ticket on keypress

Name of the instruction block (in this example): **10**
Print key assigned with instruction block **10**
Pressing the print key triggers the output of a print ticket.

If the instruction block is sealed, the data record can be output only when the indication is stable. If the instruction block is not sealed, the FREEZE WEIGHT VALUES WHEN STABLE instruction <FA1> must be included as the first instruction in the block.

Output on printer

```
No.          41   08.10.2004 10:40
Gross                   25.250 kg
Tare                     5.000 kg
Net                   20.250 kg
--------------------------------
```

22.5.2 Data record to computer

The serial number and the current gross, tare and net weight values are sent to interface 2 in CSV format. The output can be initiated both by keypress on the indicator and by transmission of an instruction from the computer to the weighing instrument.

Instructions	Remarks
<FA1> or <FA0>	(Additional function, if required) Freeze weight values and wait for stable indication or Freeze weight values without waiting for stable indication
<GP11>	Serial no. (10 digits, value right justified with leading spaces)
<EA1;>	Delimiter (semicolon)
<GB1>	Gross (8 digits, value right justified with leading spaces)
<EA1;>	Delimiter (semicolon)
<GS1>	Tare (8 digits, value right justified with leading spaces)
<EA1;>	Delimiter (semicolon)
<GN1>	Net (8 digits, value right justified with leading spaces)
<EA1\013\010>	End of data record (line break, \013 = [CR], \010 = [LF])
<Fa>	(Additional function, if required) Enable weight values.

Output to computer on keypress

Name of the instruction block (in this example): **10**
Print key assigned with instruction block **10**
Pressing the print key triggers the transmission of data.

If the instruction block is sealed, the data record can be output only when the indication is stable.
If the instruction block is not sealed, the data record is output immediately.

If a non-sealed instruction block is to be output only when the indication is stable, the FREEZE WEIGHT VALUES WHEN STABLE instruction <FA1> must be included as the first instruction in the block.

Data record: `·····1234;··25,250;···5,000;··20,250[CR][LF]`

Output to computer on request via instruction

The data record can also be requested from the computer by sending the <FP010> instruction via the serial interface. The device responds with the data record described.

If the instruction block is sealed, the data record can be output only when the indication is stable.
If the instruction block is not sealed, the data record is output immediately.

If a non-sealed instruction block is to be output only when the indication is stable, the FREEZE WEIGHT VALUES WHEN STABLE instruction <FA1> must be included as the first instruction in the block.

The confirmation message <FP> is also output after the data record to indicate that the instruction <FP010> was successfully executed.

Data record: `·····1234;··25,250;···5,000;··20,250[CR][LF]<FP>`

23.1 Overview

- The weight values obtained by the indicator can be sent automatically to external devices (remote displays, printers or computers).
- The data transfer can be tied to certain conditions by way of various parameters to ensure data is output only in conjunction with defined weighing instrument states.
- The interface used is user selectable.
- Besides standard print tickets, instruction blocks that output application-related data records with various bits of information and control characters or execute functions can also be invoked (see Chapter 22 “Instruction blocks“ on page 91).

23.2 Menu structure

Automatic output characteristics can be set on the menu level AUTo o in the device configuration menu. Some menu items are displayed only when certain other characteristics are preselected. The details are described in the menu table on the following pages.

├	
├ dCoNFG	
│ ├ AUTo o	Automatic output
│ │ ├ PRI.TYP	Print type (output mode)
│ │ │ ├ PERMANENT dATA oUTPUT	PERMANENT dATA oUTPUT
│ │ │ ├ No	No (only when indication is stable)
│ │ │ └ YES	Yes (with time interval)
│ │ ├ No.STAB	Number of outputs when indication is stable
│ │ │ └ 1	Specification of number
│ │ ├ Δ LoAd	Minimum load change
│ │ │ └ 5	Load change (weight value)
│ │ ├ INTERV	Interval between 2 outputs
│ │ │ └ 2	Interval (in seconds)
│ │ ├ NET.) 5d	Net greater than 5d
│ │ │ ├ YES	Yes (output only if net load greater than 5d)
│ │ │ └ No	No (output even if net load smaller than 5d)
│ │ ├ NET.) 0	Net greater than 0
│ │ │ ├ YES	Yes (output only if net load positive)
│ │ │ └ No	No (output even if net load negative)
│ │ ├ CUSTPT	Selection of custom print ticket
│ │ │ └ 10	Name of instruction block (e.g. 10)
│ │ └ INTER.	Interface
│ │ └ INTER.1	Interface 1 (output interface)
│ ├	
├	

23.3 Menu table

Menu text	Default	Possible settings
dConFG Device configuration		Enter menu with the ☰ key. Select dConFG using the →T← ↓ and ◎ ↑ keys and confirm.
****** Password	Manu-factu-rer's num-ber	Enter password and confirm by pressing →0← ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
AUTo o Auto output		Select menu item AUTo o and confirm.
PRT.TYP Print type		Automatic output mode.
PERMANENT dATA oUTPUTE Permanent data output No YES	No	Ticker text "Permanent data output" If No is selected, data can be output only when the indication is stable. If YES is selected, data is output continuously when the indication is stable and when it is unstable.
No.STAB Number when stable		Number of outputs when indication is stable. Menu option appears only if PERMANENT DATA OUTPUT in MODE has been set to NO.
1 Number	0	Number of identical outputs to be executed when indication is stable. Possible settings: 0 to 255 If 0 is selected, automatic output is disabled. If 1 to 255 is selected, the output is effected the set number of times. If the number is greater than 1, an interval between outputs can be set.
Δ LoAd Delta load		Minimum load change. Menu option appears only if PERMANENT DATA OUTPUT in MODE has been set to NO.
1.5		Minimum load change that triggers a new data output cycle when the indication is stable. This parameter can be used to suppress an unwanted data output caused by brief instability in conjunction with minor load changes or weighing platform fluctuations below the set threshold. The parameter is entered in the unit of the weighing instrument (kg or g).
INTERV Interval		Interval between two outputs. Menu option appears only if PERMANENT DATA OUTPUT in MODE has been set to YES or the NUMBER WHEN STABLE has been set to greater than 1.
2.5		Interval between individual outputs (in seconds). Possible values: 0.200 to 999999
NET > 5d Net > 5d		Net greater than 5d.
YES No	YES	If YES is selected, data is output only when the net weight value is greater than 5 d (scale intervals). If No is selected, data is also output when the net weight is smaller.
NET > 0 Net weight > 0		Net greater than 0

Menu text	Default	Possible settings
YES No	YES	If YES is selected, data is output only when the weight value is greater than 0 (positive). If No is selected, data is also output when the net value is negative (e.g. when discharge weighing).
CUSTPT Custom print ticket		Select menu item using the →T← ↓ and ⊙ ↑ keys and confirm.
ID Name of an instruction block		If a standard print ticket is not to be used, the name of an instruction block set up for the output of data can be entered here. If no instruction block name is entered, the standard print ticket is used.
INTER Interface		Data output interface. Menu option appears only if no instruction block NAME has been specified in conjunction with CUSTOM PRINT TICKET.
INTERV 1 Interface	1	Select the interface at which the automatic output is to be effected. The standard print ticket selected for this interface is then output. (If, in conjunction with CUSTOM PRINT TICKET, the name of an instruction block has been specified, the output interface and the data format are defined by the instructions in the instruction block.)
0.000		Exit menu with the C key. Indication of the weight.

23.4 Particularities

If the PERMANENT OUTPUT mode is set to YES, weighing results are output cyclically regardless of whether the indication is stable or not. The pause between outputs can be set in the parameter INTERVAL.

If the PERMANENT OUTPUT mode is set to NO, weighing results are output only when the indication is stable. The number of outputs then executed can be set in the parameter NUMBER WHEN STABLE. The indication remains unchanged, even when the load changes, until the specified number of outputs have been completed.

If the NUMBER WHEN STABLE is set to a large value and, additionally, a pause between the individual outputs has been selected in the parameter INTERVAL, the output process can take a very long time. The device generates identical copies of the first output and remains unchanged until the final copy is output.

23.5 Disabling automatic output

To disable AUTOMATIC OUTPUT, the PERMANENT OUTPUT mode must be set to NO and the NUMBER WHEN STABLE to 0.

24.1 Prerequisites

24.1.1 Standard

The alibi memory is a standard function and can be created and configured on the indicator. Two types of entry are available for selection:
TYPMAX = Typ:Max = Ser. No. - Date - Time - Range - Gross - Tare 1 - Tare 2 - PT - Net
TYPMIN = Typ:Min = Ser. No. - Range - Net

A total of **36,044** weighings can be stored using "Typ:Max", **135,168** with "Typ:Min".

As "Typ:Min" contains no date, the menu items for the retention period ("Period in days" and "Overwrite old entries") are not available when this type is selected. When the alibi memory is full, additional entries overwrite the existing entries, starting at the beginning.

24.1.2 With memory expansion

If an optional memory expansion card is used, the memory capacity increases to twice the number of potential records. If the optional memory expansion card is fitted after the alibi memory was set up, the alibi memory must be cleared in the menu and then set up again. The additional memory chip on the expansion card is then included in the memory management system of the alibi memory.

With memory expansion the alibi memory can store **72,072** or **270,303** weighings.

The memory expansion card may not be removed or exchanged once the alibi memory has been set up. This would destroy the memory management system and the data would be lost.

24.2 Password

When configuring the alibi memory it is necessary to enter a password on some menu levels. The password should be kept confidential and disclosed only to a restricted group of people. It is the same for all password-protected alibi memory menu levels.

The default password is **74979**

24.3 Creating/clearing the alibi memory

24.3.1 Menu structure

The alibi memory is created and cleared in the device configuration menu.

```
├ ....
├ dCoNFG
│  ├ ....
│  │  If an alibi memory has yet to be created
│  ├ SETALI                    Create alibi memory
│  │  If an alibi memory has already been created
│  ├ CL. ALI                   Clear alibi memory
│  ├ ....
├ ....
```

24.3.2 Menu table

Create alibi memory

The alibi memory can be set up in the device configuration menu.

Menu text	Default	Explanation
dConFG Device configuration		Enter menu with the ☰ key. Select dConFG using the +T- ↓ and ⊙ ↑ keys and confirm.
****** Password	Manu-factu-rer's num-ber	Enter password and confirm by pressing +0- ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
SETUP ALI Create alibi memory		Select menu item SETUP ALI using the +T- ↓ and ⊙ ↑ keys and confirm (if the alibi memory already exists, CL. ALI appears).
ALIBI dATA RECoRd Alibi data record TYPMAX Typ:Max TYPMIN Typ:Min	TYPMAX	Ticker text "Alibi data record" followed by a prompt of the data record type. Select data record type and confirm. TYPMAX An entry in the alibi memory contains the following values: Ser. No. - Date - Time - Range - Gross - Tare 1 - Tare 2 - PT - Net TYPMIN An entry in the alibi memory contains the following values: Ser. No. - Range - Net
MAX. STORAGE SPACE Maximum storage space 36044	36044 or 135 168	Ticker text "Maximum storage space" followed by the number of possible alibi memory entries. The value is determined by the size of the memory chip and cannot be changed (with memory expansion 72080 or 270303). Confirm the display.
TIME IN dAYS Time in days 90	90	Ticker text "Time in days" followed by the retention period for alibi memory entries (menu item appears only on selection of data record: TYPMAX). The period is entered in days and must be selected in accordance with the applicable regulations or terms of business of the user. Confirm the period entered.
oVERWRITE oLd ENTRIES Overwrite old entries YES No	YES	Ticker text "Overwrite old entries" followed by Yes/No prompt (menu item appears only on selection of data record: TYPMAX) If there is no available space in the alibi memory, entries that are older than the set retention period can be overwritten. On selection and confirmation of YES, older entries are overwritten automatically. On selection and confirmation of No, older entries are not overwritten. No new alibi memory entries can be added. The alibi memory entries are to be erased on being secured (printout).
ALIBI MEMORY IS ACTIVE Alibi memory is active		Ticker text "Alibi memory is active" The alibi memory has been created.
CL. ALI		The menu item SETUP ALI (Create alibi memory) changes to CL. ALI (Alibi memory CL = clear)
0.000		Exit menu with the ☰ key. Indication of the weight.

The alibi memory can now be used.

Clear alibi memory

The alibi memory can be cleared in the device configuration menu. The alibi memory is disabled with the function CLEAR ALIBI MEMORY and all entries are erased. If the alibi memory still contains data that needs to be secured, its contents must first be output (e.g. printed out) in accordance with the regulations applicable to verification. See Operating Manual, "Alibi memory".

Menu text	Default	Possible settings
dCoNFG Device configuration		Enter menu with the ☰ key. Select dCoNFG using the +T− ↓ and ◎ ↑ keys and confirm.
****** Password	Manu-factu-rer's num-ber	Enter password and confirm by pressing +0− ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 CL. ALI Clear (remove) alibi memory		Select menu item CL. ALI using the +T− ↓ and ◎ ↑ keys and confirm (if the alibi memory does not exist, SETUP ALI appears).
2 ***** Password	74979	Enter password and confirm.
1 LIGHT		The alibi memory is cleared and the next menu level is displayed.
0.000		Exit menu with the ☰ key. Indication of the weight.

The alibi memory has now been cleared and is no longer active. It can, however, be set up again.

Change data record type

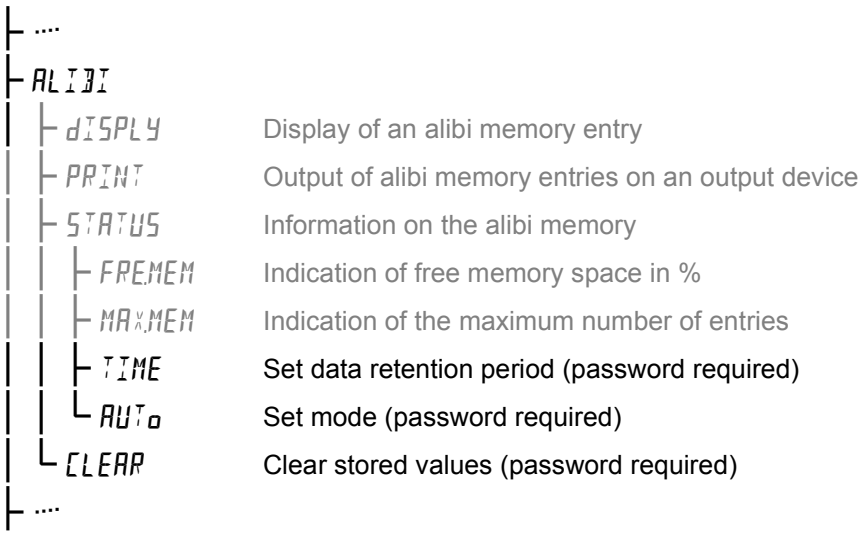
It is not possible to change the data record type from TYP MAX to TYP MIN or vice versa. To do this, the alibi memory would have to be cleared completely and then re-created with the desired data record. When the alibi memory is cleared, all the records in it are lost.

24.4 Managing the alibi memory

The menu for managing the alibi memory appears only if the alibi memory has been set up. If the alibi memory has not been set up or has been cleared, this menu level is not displayed.

The menu levels that are accessible without a password are described in detail in the operating manual and are not included here again.

24.4.1 Menu structure



24.4.2 Menu table

Set data retention period

This setting is available only if data record TYPMAX has been selected.

The retention period specifies how long the entries in the alibi memory have to be retained.

Menu text	Default	Possible settings
ALIBI Alibi memory		Enter menu with the ☰ key. Select ALIBI using the T+↓ and ◎↑ keys and confirm.
STATUS Status		Select menu item STATUS using the T+↓ and ◎↑ keys and confirm.
TIME Retention period		Select menu item TIME using the T+↓ and ◎↑ keys and confirm.
***** Password	74979	Enter password and confirm.
90	90	Retention period for alibi memory records. The period is entered in days and must be selected in accordance with the applicable regulations or terms of business of the user. Confirm the period entered.
AUTo		Exit menu with the ☰ key.
0.000		Indication of the weight.

This setting is available only if data record TYPMAX has been selected.

This option determines how entries that are older than the set retention period are to be handled if the alibi memory is full. If the entries are not overwritten automatically, they must be erased manually if the alibi memory is full.

Menu text	Default	Possible settings
ALIBI Alibi memory		Enter menu with the ☰ key. Select ALIBI using the ↓ and ↑ keys and confirm.
1 STATUS Status		Select menu item STATUS using the ↓ and ↑ keys and confirm.
2 AUTo Overwrite automatically		Select menu item AUTo using the ↓ and ↑ keys and confirm.
2 ***** Password	74979	Enter password and confirm.
3 oVERWRITE oLd ENTRIES Overwrite old entries YES No	YES	Ticker text "Overwrite old entries" followed by Yes/No prompt. If there is no available space in the alibi memory, entries that are older than the set retention period can be overwritten. On selection and confirmation of YES, older entries are overwritten automatically. On selection and confirmation of No, older entries are not overwritten. No new alibi memory entries can be added. The alibi memory entries are to be erased on being secured (printout).
2 FREMEM		Exit menu with the ☰ key.
0.000		Indication of the weight.

Delete entries

The delete operation creates memory space for new entries. If the alibi memory is optimally configured this operation is not usually necessary. Entries that are older than the set retention period are overwritten automatically.

If the alibi memory still contains data that needs to be secured, its contents must first be output (e.g. printed out) in accordance with the regulations applicable to verification. The respective prompt appears automatically.

Menu text	Default	Possible settings
ALIBI Alibi memory		Enter menu with the ☰ key. Select ALIBI using the T↓ and ↑ keys and confirm.
1 CLEAR Clear		Select menu item CLEAR using the T↓ and ↑ keys and confirm.
2 ALL All oLd Old	ALL	Select function using the T↓ and ↑ keys and confirm. ALL = all entries in the alibi memory are deleted. oLd = only entries that are older than the set retention period are deleted. If no such entries are found in the alibi memory on confirmation of the selection, ticker text No ENTRIES appears.
2 ***** Password	74979	Enter password and confirm.
3 INTER.1		Select the interface at which the data is to be output before being deleted.
3 --		Data is output at the selected interface.
3 PRINTOUT ok Printout OK		Ticker text "Printout OK" followed by Yes/No prompt. If the output is not OK, select No and confirm. The entries are not deleted and the operation can be repeated. If the output is OK, select YES and confirm. The entries are deleted.
2 ALL		Exit menu with the ☰ key.
0.000		Indication of the weight.

25.1 Overview

Power can be supplied to the device by a standard or rechargeable battery. A subsequent modification from mains to battery operation is possible.

To obtain a long operating time in battery mode, power consumption can be reduced automatically when the device is not in use or the device can be shut down completely.

Standby: When the weighing instrument is not being used (indication stable and keypad not being operated), the display background light is switched off after the set time. This reduces the current drain. As soon as the weight value changes or a key is pressed, the background light switches back on again.

Power off: If the device is not used for a long time, it switches off automatically. As no power is used when the device is switched off, the battery does not discharge. To continue weighing, switch the device back on using the ⏻ key.

Undervoltage: If the device detects an undervoltage, the background light is switched off automatically. The device remains in weighing mode. The message BAT (battery) briefly appears on the display approx. every ten seconds.

If the undervoltage condition persists, the device switches itself off after a few minutes. If the voltage increases again, the background light is switched on automatically. If the voltage falls again, the device switches itself off automatically.

25.2 Menu structure

Password protection settings are made on menu level PASSWd in the device configuration menu.

├	
├ dCoNFG	
│ ├	
│ ├ BAT.	Battery mode
│ │ ├ ACTIVE	Activate battery mode
│ │ │ ├ No	Battery mode inactive
│ │ │ └ YES	Battery mode active
│ │ ├ STTIME	Standby time
│ │ │ └ 120	120 seconds
│ │ └ SHTIME	Shutdown time
│ │ └ 1800	1,800 seconds
│ ├	
├	

25.3 Menu table

Menu text	Default	Explanation
dCoNFG Device configuration		Enter menu with the ☰ key. Select dCoNFG using the ↓ and ↑ keys and confirm.
****** Password	Manu-factu-rer's number	Enter password and confirm by pressing ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 BAT. Battery mode		Select menu item BAT. and confirm.
2 ACTIVE Active		Activate battery mode. Confirm the display.
3 No YES	No	Select either YES or No using the ↓ and ↑ keys and confirm. If No is selected: battery mode inactive. If YES is selected: battery mode active.
		The next menu items ST.TIME and SH.TIME are displayed only if YES (battery mode active) has been selected.
2 ST.TIME Standby time		Set standby time.
3 120	120	Enter the time in seconds and confirm. Value range between 10 and 999999. When not in use, the device switches off the display background light after the set time.
2 SH.TIME Shutdown time		Set shutdown time.
3 1800	1800	Enter the time in seconds and confirm. Value range between 0 and 999999. When not in use, the device switches off after the set time. If the shutdown time selected is smaller than or equal to the standby time, the device remains in standby mode instead of switching off.
2 ACTIVE Active		Exit menu with the ☰ key.

26.1 Function

The background light provides good display legibility even in poor lighting conditions. To reduce device power consumption in conjunction with portable, battery-operated weighing systems, the background light can be switched off. This increases the battery operating time.

26.2 Menu structure

26.3 Menu table

Menu text	Default	Explanation
dCoNFG Device configuration		Enter menu with the ☰ key. Select dCoNFG using the →T← ↓ and ◎ ↑ keys and confirm.
****** Password	Manu-facturer's number	Enter password and confirm by pressing →0← ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 LIGHT Light		Select menu item LIGHT and confirm.
2 YES No	YES	If YES is selected: background light ON. If No is selected: background light OFF.
1 LIGHT Light		Exit the menu by pressing the menu key ☰.

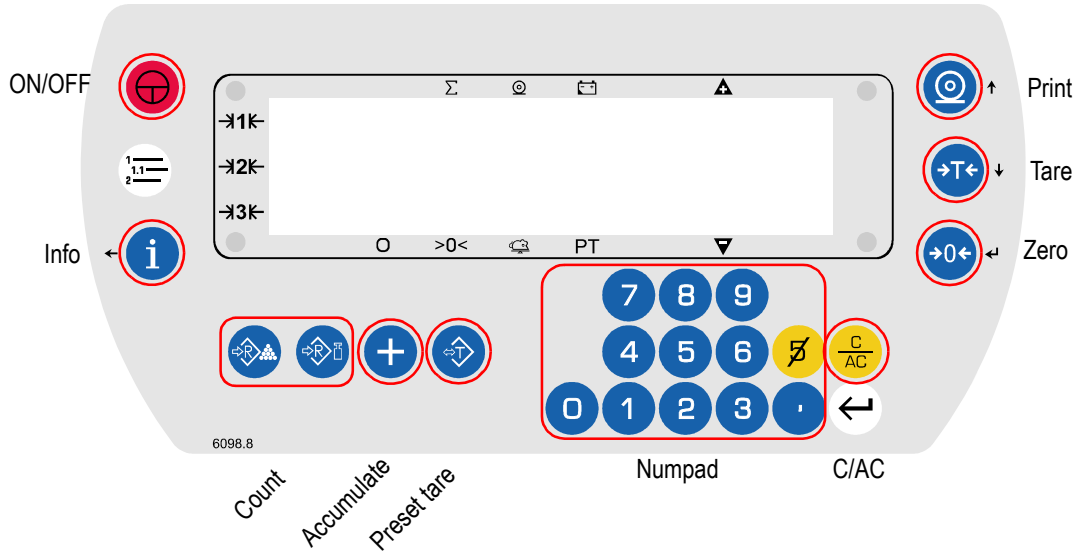
27.1 Overview

The KEY LOCK function allows individual keys or groups of keys to be locked. The user can then no longer access the functions. Pressing a locked key will not produce a response from the device.

Locked keys required for menu operation are enabled automatically on accessing the menu to permit navigation in the menu. Only the basic function of the key in weighing mode is disabled.

27.2 Keys and groups

The following keys can be locked individually or in groups:



27.3 Menu structure

Key lock settings are made in the device configuration menu.

├	
├ dCoNFG	Device configuration
│ ├	
│ ├ KEYLoK	Key lock
│ │ ├ oNKEY	ON/OFF key
│ │ │ ├ oN/oFF KEY ACTIVE	ON/OFF key active
│ │ │ ├ YES	ON/OFF key is active
│ │ │ └ No	ON/OFF key is not active (locked)
│ │ ├ ALLKEY	All keys
│ │ │ ├ KEYLoCK ACTIVE	Key lock active
│ │ │ ├ No	No keys are locked
│ │ │ └ YES	All keys are locked
│ │ └ INdKEY	Individual keys
│ │ ├ PRESS KEY	Press key
│ │ ├ - - -	Press key(s) to be locked
│ │ └ oK	Finally, confirm by pressing ↵
│ ├	
├	

27.4 Menu table

Menu text	Default	Explanation
dCoNFG Device configuration		Enter menu with the ☰ key. Select dCoNFG using the T↓ and ⊙↑ keys and confirm.
****** Password	Manu-factu-rer's number	Enter password and confirm by pressing 0↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 KEYLoK Key lock		Select menu item KEYLoK and confirm.
2 oNKEY ON/OFF key		Lock ON/OFF key
3 oN/oFF KEY ACTIVE ON/OFF key active		Ticker text "ON/OFF key active" followed by YES/NO prompt.
3 YES No	YES	If YES is selected: ON/OFF key active. If No is selected: ON/OFF key inactive (locked). The device can be switched on using the ON/OFF key, but no longer switched off.
2 ALLKEY All keys		Lock all keys.
3 KEY LoCK ACTIVE Key lock active		Ticker text "Key lock active" followed by YES/NO prompt.
3 No YES	No	If No is selected: no keys are locked. If YES is selected: all keys are locked.
2 INdKEY Individual keys		Lock individual keys.
3 PRESS KEY Press key		Ticker text "Press key"
3 - - -		Press keys to be locked one after the other. If a key is pressed again, the key lock is cancelled. The current key status is displayed briefly when the key is pressed: KEY IS LoCKEd (Key is locked) KEY IS ACTIVE (Key is active) (The ON/OFF key cannot be locked here; this can be done only in menu item oNKEY)
3 oK OK		To end, confirm by pressing ↵. OK appears briefly on the display.
2 INdKEY Individual keys		Exit menu with the ☰ key.

27.5 Disable all key locks

If individual keys have been locked, the key lock for all these keys can be disabled by way of menu item ALLKEY (All keys).

Menu text	Default	Explanation
dCoNFG Device configuration		Enter menu with the ☰ key. Select dCoNFG using the ⊕T↓ and ◎↑ keys and confirm.
****** Password	Manu-factu-rer's number	Enter password and confirm by pressing ⊕0↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 KEYLoK Key lock		Select menu item KEYLoK and confirm.
2 ALLKEY All keys		Select menu item ALLKEY and confirm.
3 KEY LoCK ACTIVE Key lock active		Ticker text "Key lock active" followed by YES/NO prompt.
3 No YES	No	If No is selected: no keys are locked. If YES is selected: all keys are locked. Select No and confirm.
2 INdKEY Individual keys		Exit menu with the ☰ key.

28.1 Setting the clock

Depending on the features available, the indicator has an integral clock. The clock is factory set.

The settings for properties such as automatic summer/winter changeover and calibration factor are made here.

28.2 Menu structure

├	
├ dConFG	
│ ├	
│ ├ CLoCK	Clock
│ │ ├ dATE	Date
│ │ │ └ 15.10.06	Enter the date (DD.MM.YY)
│ │ ├ TIME	Time
│ │ │ └ 10.25.06	Enter the time (HH.MM.SS)
│ │ ├ AUTS/W	Automatic summer/winter changeover
│ │ │ ├ YES	Yes (auto summer/winter changeover)
│ │ │ └ No	No (no auto summer/winter changeover)
│ │ └ CALIBR	Calibration factor
│ │ └ 000	Enter calibration factor
│ ├	
├	

If the menu item CLoCK does not appear, the device is not equipped with a clock.

28.3 Calculating the calibration factor

Any clock drift due to tolerances of the electronic components in use are compensated for by the calibration factor. Values between -31 and +31 can be selected as the calibration factor. The default factory setting is 0.

1 step between +1 and +31 corresponds to a correction of +10.7 seconds per month.
1 step between -1 and -31 corresponds to a correction of -5.35 seconds per month.

Example

The clock loses 30 seconds a month.

The clock has to be speeded up by calibration.

Calibration factor = deviation ÷ correction coefficient = 30 $^{s}/_{Month}$: 10.7 $^{s}/_{Month}$ = +2.8 (~ +3)

Enter +3 as the calibration factor.

28.4 Menu table

Menu text	Default	Explanation
dCoNFG Device configuration		Enter menu with the ☰ key. Select dCoNF using the +T- ↓ and ⊙ ↑ keys and confirm.
****** Password	Manu-factu-rer's number	Enter password and confirm by pressing +0- ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
CLoCK Clock		Select menu item CLoCK and confirm.
dATE Date		To set the date, confirm with +0- ↵.
23.10.06 DD.MM.YY		The entry position flashes and the value can be changed using the arrows. Confirm each value selected by pressing +0- ↵. On confirmation of the year the setting is complete and the next menu level is displayed.
TIME Time		To set the time, confirm with +0- ↵.
09.35.18 HH.MM.SS		The entry position flashes and the value can be changed using the arrows. Confirm each value selected by pressing +0- ↵. On confirmation of the seconds the setting is complete and the next menu level is displayed.
AUTS/W Auto summer/ winter changeover		To set the automatic summer/winter changeover, confirm with +0- ↵.
YES No	YES	The summer time function applies for the CET zone. On the last Sunday in March the clock is moved forward from 2 am to 3 am. On the last Sunday in October the clock is moved back from 3 am to 2 am. YES : Automatic summer/winter changeover. No : No automatic summer/winter changeover.
CALIBR Calibration factor		To set the calibration factor, confirm with +0- ↵.
000	00	Use the +T- ↓ and ⊙ ↑ keys to set the calibration factor. Value range between -31 and +31. For information on calculating the calibration factor, see 28.3 "Calculating the calibration factor" on page 113. Confirm the value entered by pressing +0- ↵.
dATE Date		Exit the menu by pressing the menu key ☰.

29.1 Overview

Access to the device settings (device configuration), the verification seal and the adjustment data is password protected. The password can be changed and the scope of protection selected.

The device is shipped with the manufacturer's number as the password. The six-digit manufacturer's number is indicated on the indicator data plate and is also displayed on device power up. All six digits of the manufacturer's number must be entered as the password.

As soon as the correct password has been entered once it does not usually have to be re-entered. Access to the protected areas is granted. Access does not become password protected again until the indicator is switched off and back on.

29.2 Menu structure

Password protection settings are made on menu level PASSWd in the device configuration menu.

├	
├ dCONFG	
│ ├	
│ ├ PASSWd	Password protection
│ │ ├ ACTIVE	Activate password protection
│ │ │ ├ YES	Password protection active
│ │ │ └ No	Password protection inactive
│ │ ├ NEW	Set new password
│ │ │ ├ ^^^^^^	Enter new password
│ │ │ ├ REPEAT ENTRY	Enter again
│ │ │ └ ^^^^^^	Enter password again
│ │ └ PASPOS	Set prompt point (protection level)
│ │ ├ CONFIG	Device configuration
│ │ ├ MENU	Menu
│ │ └ SEAL	Verification seal
│ ├	
├	

29.3 Menu table

Menu text	Default	Explanation
dCoNFG Device configuration		Enter menu with the ☰ key. Select dCoNFG using the ↓ and ↑ keys and confirm.
****** Password	Manu-factu-rer's number	Enter password and confirm by pressing ↵. The password need only be entered once. The configuration level can then be accessed until such time as the device is switched off and back on again.
1 PASSWd Password		Select menu item PASSWd and confirm.
2 ACTIVE Active		Activate password protection. Confirm the display.
3 YES No	YES	Select either YES or No using the ↓ and ↑ keys and confirm. If YES is selected: password protection active. If No is selected: password protection inactive, and the password is reset to the default password (manufacturer's number). The password is always prompted when destroying the verification seal and on some menu levels.
2 NEW New		Enter new password. Confirm the display.
3 ^^^^^^		Enter new password and confirm.
3 REPEAT ENTRY Repeat entry ^^^^^^		Ticker text "Repaet entry". Enter new password again and confirm.
2 PASPoS Password position		Set prompt point.
3 CoNFIG Device configuration MENU Menu SEAL Verification seal	CoNFIG	Select prompt point and confirm. The scope of protection can be set on three levels by specification of the password prompt point. The password is always prompted when destroying the verification seal and on some menu levels. CoNFIG: Password prompt on entering the device configuration menu (medium protection). MENU: Password prompt on pressing the menu key. (high protection) SEAL: Password prompt only when destroying the verification seal. (low protection)
2 PASPoS Password position		Exit menu with the ☰ key.

If the default password is changed, the new password should be kept in a safe place.

If the password is unknown, not all levels of the device configuration or adjustment menus will be accessible, depending on the password prompt point. In this case, only the customer service team can reset the password protection level to the default password.